A revision of *Stylidium* sect. *Debilia* Mildbr., *S.* sect. *Floodia* Mildbr. and *S.* sect. *Lanata* A.R.Bean (Stylidiaceae)

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Summary

Bean, A.R. (1999). A revision of *Stylidium* sect. *Debilia* Mildbr., *S.* sect. *Floodia* Mildbr. and *S.* sect. *Lanata* A.R.Bean (Stylidiaceae). *Austrobaileya* 5(3): 427-455. Three taxonomic sections of *Stylidium* are enumerated (*S.* sect. *Debilia, S.* sect. *Floodia* and *S.* sect. *Lanatae* sect. nov.) comprising 25 species (including *S. austrocapense, S. delicatum, S. foveolatum, S. velleioides* spp. nov. and *S. paniculatum* comb. nov.) indigenous to northern and eastern Australia (Kimberley region of Western Australia, Northern Territory, Queensland and northern New South Wales). The new species are illustrated, while for all species, distribution maps and notes on habitat, conservation status and taxonomic affinities are provided.

Keywords: *Stylidium, Stylidium* sect. *Floodia, Stylidium* sect. *Debilia*, *Stylidium* sect. *Lanata*, taxonomy, keys, Australian flora, Stylidiaceae.

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Introduction

The genus *Stylidium* Willd. is largely restricted to Australia, and reaches its greatest species diversity in south-western Western Australia. Comprehensive accounts of the genus have been provided by Brown (1810), de Candolle (1839), Bentham (1868), Mildbraed (1908) and Erickson (1958).

Three related sections are treated in this paper: *S.* sect. *Floodia* was established by Mildbraed (1908) with the single species, *S. floodii* F.Muell. In recent years, several species related to *S. floodii* have been described, notably by Lowrie and Kenneally (1997). Most of the constituent species are confined to tropical Australia, with *S. desertorum* Carlquist occuring in semi-arid areas.

S. sect. *Debilia* is typified by *S. debile* F.Muell., and it comprises several species indigenous to northern, central and eastern Australia, as far south as Sydney.

S. eriorhizum R.Br. was included in *S.* sect. *Debilia* by Mildbraed (loc. cit.). It and two other species described by Bean (1999) are here placed into a new section (*S.* sect. *Lanata*) on the basis of the thickened woolly plant bases, perennial habit, indeterminate central rachis and large spherical seeds with a small nipple.

All of the species presented here belong in *S.* subg. *Tolypangium* (Endl.) Mildbr. Three members of this subgenus occurring in northern Australia do not belong to any of the sections treated here. *S. graminifolium* Sw. belongs in *S.* sect. *Stylidium*, while *S. eglandulosum* F. Muell. and *S. laricifolium* A. Rich. belong in *S.* sect. *Sparsifolia* Benth. No species belonging to *S.* section *Tolypangium* occur in northern and eastern Australia.

Terminology

The flowers of all *Stylidium* species are gamopetalous, as they possess a corolla tube, albeit usually rather short and inconspicuous. However, the corolla lobes (called petals in this paper) are here treated as being "free" if they are not united beyond the top (or "throat") of the corolla tube. This interpretation is in line with Erickson (1958) and avoids confusion when referring to the apical ornamentation of the corolla parts, which would otherwise be known as lobes of the corolla lobes.

Because the pattern of petal fusion is very valuable in diagnosing *Stylidium* species,

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a special terminology is used here. A1 and A2 refer to the anterior petals (on either side of the labellum); P1 and P2 refer to the posterior petals, with A1 being adjacent to P1. The '+' operator indicates that the petals indicated are free (sensu Erickson), while a '/' operator indicates that the petals indicated are fused e.g. A1 + A2 + (P1/P2) means that the anterior petals are free from the posterior petals and from each other, but that the posterior petals are fused to each other.

The term paracorolla, used here, was introduced by Slooten (1954), and refers to small lobes or flanges of tissue attached to the corolla at the throat. This term is roughly equivalent to the commonly used term "throat appendages", but is more comprehensive, as it covers situations where there is a continuous raised ring of tissue.

Materials and methods

This revision was based on the examination of herbarium specimens, spirit material and reconstituted floral material from AD, BM, BRI, K, DNA, MBA, QRS, NSW and MEL, and was supplemented by field work by the author throughout Queensland. Floral measurements were based on material preserved in spirit, where it was available, or on herbarium material reconstituted by boiling in water. Details of the collections used for these measurements are given in each species treatment. Leaves, stems, scapes, capsules and seeds were measured from dried material.

Morphological data for all taxa have been recorded as a DELTA data set (Dallwitz et al. 1993), and species descriptions have been generated by DELTA from these data.

Dimensions of various plant parts are given as *circa* only when there was difficulty in providing accurate measurements e.g. petiole length for some species, or when less than 4 measurements were possible for the character, because of lack of available material.

Distribution maps are provided for all species. A symbol indicates a herbarium record for the taxon within that 1° x 1° square. Solid (or filled) symbols indicate that there is at least one recent collection (1960-present). Outline (or unfilled) symbols indicate that the most recent collection for that 1° x 1° square was before 1960. Latitude and longitude data from Lowrie and Kenneally (1997) have been added to the maps for *S. leptorrhizum* (syn. *S. barrettorum*) and *S. adenophorum*, and from Kenneally and Lowrie (1994) for *S. costulatum*.

Taxonomy

Key to the *Stylidium* subgenera occurring in northern and eastern Australia

1. Hypanthia and capsules linear, 8–20 times longer than wide 2
   Hypanthia and capsules globose to ellipsoidal, 1–4 times longer than wide 3

2. Petals laterally fused (A1/P1) + (A2/P2) . . . . **S.** subg. **Alsinoides**
   Petals all free or posterior petals fused . . . . **S.** subg. **Andersonia**

3. Hypanthia and capsules globose, 1–1.3 times longer than wide . . . . . . **S.** subg. **Centridium**
   Hypanthia and capsules ellipsoidal to obconical, 1.4–4 times longer
   than wide . . . . **S.** subg. **Tolypangium**

Stylidium subg. **Tolypangium** (Endl.) Mildbr., Pflanzenr. 35: 31 (1908); *S.* sect. *Tolypangium* Endl., Gen. Pl. 520 (1838). **Type:** not designated.

Key to the species of *Stylidium* sect. *Floodia*, *S.* sect. *Debilia* and *S.* sect. *Lanata*

1. Leaves linear, less than 1 mm wide (sect. *Floodia*) 2
   Leaves oblanceolate or spathulate, 2.4–10.7 mm wide 14

2. Inflorescences 1-flowered .... **3. S. rubriscapum**
Inflorescences many-flowered, cymose 3

3. Capsule conspicuously 5-angled 4
Capsule smooth or ribbed, but not 5-angled 5

4. Leaf apex acute; 2 sepals fused except at apex; capsule c. 4.5 mm long .... **10. S. costulatum**
Leaves bluntly mucronate; sepals all free; capsule 2.5–3 mm long .... **9. S. turbinatum**

5. Leaves with glandular hairs, leaf apex obtuse .... **12. S. adenophorum**
Leaves glabrous, leaf apex acute to mucronate 6

6. Hypanthium and sepals glabrous .... **1. S. foveolatum**
Hypanthium and sepals glandular-hairy 7

7. Flowers with 3 free sepals and 2 fused sepals 8
Flowers with sepals all free 10

8. Leaves mostly in terminal rosette 9
Leaves scattered along stems .... **2. S. clarksonii**

9. Bracts glandular-hairy; anterior petals entire .... **8. S. delicatum**
Bracts glabrous; anterior petals bilobed .... **7. S. symonii**

10. Scapes thick (1.0–2.3 mm in diameter); leaves (11–)16–75 mm long; labellum with basal appendages .... **11. S. desertorum**
Scapes thin (0.3–1.0 mm in diameter); leaves 10–35 mm long; labellum without basal appendages 11

11. Leaves with needle-like mucro .... **5. S. mucronatum**
Leaves acute to acuminate 12

12. Sepals ovate; anterior petals c. 3.5 mm long, bilobed .... **4. S. rivulosum**
Sepals deltate to lanceolate; anterior petals 0.9–2.6 mm long, entire 13

13. Leaves 10–25 mm long, glandular hairs 0.3–0.5 mm long; sepal apex acute to acuminate .... **8. S. delicatum**
Leaves 22–35 mm long, glandular hairs 0.15–0.2 mm long; sepal apex obtuse .... **6. S. floodii**

14. Plants with conspicuous woolly rootstock; inflorescence with indeterminate central rachis; seeds spherical, 0.4–0.8 mm across, with a small nipple (sect. *Lanata*) 15
Plants with unthickened rootstock; inflorescence cymose without central rachis, or racemose; seeds globose to ellipsoidal, 0.2–0.4(–0.5) mm long, without nipple (sect. *Debilia*) 17

15. Inflorescence branches and bracts glabrous; leaves (including petioles) 9–14 mm long .... **24. S. ramosissimum**
Inflorescence branches and bracts glandular-hairy; leaves (including petioles) 20–60(–100) mm long 16

16. Leaf margins hairy; bracts 1.5–2.5 mm long; sepals 1.0–1.7 mm long . . . . . **23. S. eriorhizum**
Leaf margins glabrous; bracts 3.5–6.5 mm long; sepals 2.4–2.8 mm
long . . . . **25. S. leiophyllum**

17. Leaves glandular-hairy . . . . **13. S. semipartitum**
Leaves glabrous 18

18. Scapes with long simple hairs 19
Scapes glabrous or with glandular hairs 20

19. Leaves acuminate to mucronate; scapes 0.3–0.5 mm diameter;
corolla tube glandular-hairy . . . . **17. S. floribundum**
Leaves obtuse; scapes 0.6–4.5 mm diameter; corolla tube glabrous . . **18. S. inaequipetalum**

20. Inflorescence indeterminate, racemose; bracteoles present . . . . **20. S. debile**
Inflorescence determinate, cymose; bracteoles absent 21

21. Scapes glandular-hairy 22
Scapes glabrous 24

22. Column with glandular and eglandular hairs; corolla tube
3–3.5 mm long . . . . **14. S. leptorrhizum**
Column glabrous; corolla tube 1.4–2.5 mm long 23

23. Labellum attached at base of anterior sinus; paracorolla present . . . . . . **16. S. multiscapum**
Labellum attached to outside of corolla tube; paracorolla absent . . . . **15. S. austrocapense**

24. Sepals glabrous; inflorescence branches glandular-hairy; glands
capitate; anterior petals 4.1–4.5 mm long; labellum glabrous . . . . **22. S. ornatum**
Sepals glandular-hairy; inflorescence branches glabrous;
glands ellipsoidal; anterior petals 2.5–3 mm long; labellum
glandular-hairy 25

25. Petals glandular-hairy; column 5.5–6.5 mm long; tropical
Queensland . . . . **21. S. velleioides**
Petals glabrous; column 4.5–5.5 mm long; Darling Downs
& N.S.W. . . . . **19. S. paniculatum**

Stylidium sect. **Floodia** Mildbr., Pflanzenr. 35: 41 (1908). **Type:** *S. floodii* F.Muell.

Rootstock cylindrical. Leaves linear, sessile, borne on terminal rosette and/or cauline. Glandular hairs present, glands ellipsoidal. Inflorescence determinate; flowers pedicellate; corolla tube with sinus on anterior side only; petals usually entire and obtuse, all free; labellum attached at base of anterior sinus, basal appendages absent (except *S. desertorum*). Paracorolla present or absent. Column lateral lobes absent; spur absent. Anther cells 4. Stigma sessile. Capsule obovoid to obconical; seeds globose to ellipsoidal, brown to black.

14 species, all indigenous to tropical Australia.

1. Stylidium foveolatum A.R.Bean **sp. nov.** *S. clarksonii* affinis sed scapis hypanthiis lobisque calycis glabris, petalis angustioribus, capsulis costatis et sepalis omnibus liberis differens. **Typus:** Queensland. Cook District: NE of Vrilya Point, Cape York, 11°11'S 142°09'E, 26 August 1981, *A. Morton* AM1446 & *M. Godwin* (holo: BRI; iso: MEL)

Herbaceous annual, 16–25 cm high. Glandular hairs 0.1–0.2 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, scattered along stems, linear, 6.5–14 mm long, 0.3–0.5 mm wide, glabrous, apex obtuse, base truncate, margins entire. Petioles absent. Scapes 2–5 per plant, 0.4–0.7 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 10 cm long including scape, determinate, monochasially cymose or determinate, dichasially cymose; branches glabrous. Bracts linear, 2.5–6 mm long, glabrous, obtuse. Bracteoles absent. Pedicels 1–4 mm long, glabrous. Hypanthium obovoid to ellipsoidal, glabrous. Sepals lanceolate, all free, 2–2.7 mm long, 0.3–0.5 mm wide, glabrous, obtuse. Corolla pink, glabrous or glandular-hairy on tube only; tube 1–1.5 mm long, with sinus on anterior side only. Paracorolla absent or continuous, lobed, thin, glabrous, c. 0.3 mm high. Paracorolla lobes or appendages single or absent. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.4–0.5 mm long, thick, glandular-hairy, obtuse. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 2.3–3.6 mm long, 0.8–1 mm wide, entire, obtuse. Posterior petals 2.8–3.8 mm long, 0.9–1 mm wide, entire, obtuse. Column 5–6 mm long, of uniform width throughout, glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule obconical or ellipsoidal, with 5 raised ribs, 4.2–5 mm long excluding sepals, 1.8–2 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.4 mm long, brown or black, deeply pitted. Fig 1 F-I.

***Additional specimen examined*:** **Queensland.** Cook District: Skardon River, Cape York, on Venture Mining Barge Landing, Apr 1994, *Gunness* AG2303 (BRI).

***Reconstituted or spirit material examined*:** *Gunness* AG2303 (2 fls), *Morton* AM1446 & *Godwin* (2 fls).

***Distribution and habitat*:** *S. foveolatum* is confined to north-western Cape York Peninsula, north of Weipa (Map 1). It occurs on the ecotone between mangroves and *Melaleuca viridiflora* woodland, on damp sand.

***Phenology*:** Flowers and capsules recorded for April and August.

***Affinities*:** *S. foveolatum* is closest to *S. clarksonii*, with which it shares the very distinctive black, deeply pitted seeds. It differs from *S. clarksonii* by the glabrous scapes, hypanthia and sepals, the narrower petals, the ribbed capsules, and the sepals all free from each other.

***Conservation status*:** Data Deficient (DD) category according to the International Union for Conservation of Nature and Natural Resources (Anon. 1994).

***Etymology*:** The specific epithet is from the Latin *foveolatus*, meaning minutely pitted. This is in reference to the seeds.

2. Stylidium clarksonii Lowrie & Kenneally, Nuytsia 11: 204 (1997). **Type:** Queensland. Cook District: 4.7 km south of the Chester River crossing on the road east of the McIlwraith Range towards Nesbit River, 13°41'S 143°28'E, 21 June 1993, *J.R. Clarkson* 10108 & *V.J. Neldner* (holo: PERTH; iso: BRI, DNA).

Herbaceous annual, 20–35 cm high. Glandular hairs 0.15–0.25 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below or scattered along stems, linear, 9.5–24 mm long, 0.3–0.6 mm wide, glabrous, apex obtuse or acute, base truncate, margins entire. Petioles absent. Scapes 1–5 per plant, 0.6–0.7 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 5–13 cm long including scape, determinate, monochasially cymose or determinate, dichasially cymose; branches glabrous. Bracts linear, 1.5–7.5 mm long, glabrous, acute. Bracteoles absent. Pedicels 2–4 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate, with 3 free and 2 mostly fused, 1.5–2.6 mm long, 0.4–0.6 mm wide, glandular-hairy, obtuse. Corolla pink or mauve, glandular-hairy on tube and petals; tube 1.5–2.2 mm long, with sinus on anterior side only. Paracorolla continuous, lobed, thick, minutely papillose, c. 0.2 mm high. Paracorolla lobes or appendages 2, all similar, obtuse, none opposite the anterior petals, 2 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.5–0.7 mm long, thick, glandular-hairy, obtuse or acute. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 2.7–4.2 mm long, 1.5–2.7 mm wide, entire, obtuse. Posterior petals 2.8–4.7 mm long, 1.3–2.5 mm wide, entire, obtuse. Column 4.5–5.5 mm long, of uniform width throughout, glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent or not extending beyond anthers. Capsule obconical or ellipsoidal, without raised ribs, 3.7–6 mm long excluding sepals, 1.5–2 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.4–0.5 mm long, black, deeply pitted.

***Specimens examined*:** **Queensland.** COOK DISTRICT: c. 8.5 km NW of Kennedy River bridge, between Laura and Coen, Jul 1998, *Bean* 13494 (BRI, MEL); 5.3 km SE of Hann River, on Laura-Coen road, Jul 1998, *Bean* 13530 (BRI, NSW); 28 km S of Coen, on road to Laura, Jul 1998, *Bean* 13569 (BRI); c. 15 km upstream from the upper crossing at Massy Creek on Silver Plains station, Sep 1979, *Clarkson* 2643B (BRI, PERTH, QRS); Lakefield N.P., 5 km SE of Morehead River, May 1987, *Clarkson* 7033 & *Simon* (BRI, L, MBA, NSW, PERTH); 5.2 km S of the Hann River on the Laura to Musgrave road, May 1989, *Clarkson* 8006 & *Neldner* (BRI, DNA, K, L, MBA, PERTH); 0.9 km E of the Peninsula Development road, on an IWS track 0.5 km N of Laura River crossing, Apr 1983, *Clarkson* 4734 (BRI); Bamboo Range, N of Musgrave on Peninsula Development road, Jul 1993, *Forster* PIF13451 (BRI, MEL); 1 km N of last Scrubby Creek crossing, Silver Plains station, Jul 1993, *Forster* PIF13635 & *Sankowsky* (BRI, MEL); base of Round Mtn, Embley Range, Silver Plains station, Jul 1997, *Forster* 21394 (BRI, DNA, QRS); northern side of Nesbit River, Silver Plains, Jun 1998, *Forster* PIF23002 et al. (BRI, DNA, MEL, NSW, QRS); Isabella Falls, Aug 1976, *Scarth-Johnson* 302A (BRI); 25 km S of Musgrave, Peninsula Development road, Aug 1985, *Williams* 85130 (BRI).

***Reconstituted or spirit material examined*:** *Clarkson* 7033 & *Simon* (2 fls); *Clarkson* 8006 & *Neldner* (2 fls); *Clarkson* 10108 & *Neldner* (2 fls); *Forster* PIF13451 (2 fls).

***Distribution and habitat*:** *S. clarksonii* is endemic to south-eastern Cape York Peninsula, between latitudes 13°30'S and 15°30'S (Map 1). It inhabits woodland dominated by *Eucalyptus* or *Melaleuca*, sometimes near small creeks or in seepage areas. Soils are invariably sandy.

***Phenology*:** Flowers have been recorded from April to September. Capsules have been recorded from May to August.

***Affinities*:** *S. clarksonii* is most closely related to *S. foveolatum*. Both species have very distinctive black, deeply pitted seeds.

***Conservation status*:** A widespread species which is not considered to be at risk.

3. Stylidium rubriscapum W.Fitzg., Jour. & Proc. Roy. Soc. Western Australia 3: 218 (1918). **Type:** Western Australia. Calder River; Messmate Creek in the Packhorse Range; undated, *W.V. Fitzgerald* (syn: ?PERTH n.v.).

Herbaceous annual, 10–20 cm high. Glandular hairs 0.15–0.25 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below or scattered along stems, linear, 5–12 mm long, 0.5–1 mm wide, glabrous, apex acute or acuminate, base truncate, margins entire. Petioles absent. Scapes c. 7 per plant, 0.3–0.6 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 5–15 cm long including scape, 1-flowered. Bracteoles present, c. 1.2 mm long. Pedicels 50–150 mm long, glabrous. Hypanthium obovoid to ellipsoidal, glabrous. Sepals lanceolate or ovate or elliptical, all free, 1.5–2.5 mm long, 0.7–1 mm wide, glandular-hairy, acute. Corolla pink or red, glandular-hairy on tube and petals; tube c. 1.8 mm long, with sinus on anterior side only. Paracorolla continuous, lobed, thin, minutely papillose, c. 0.5 mm high. Paracorolla lobes or appendages 3, all similar, acute, 2 opposite the anterior petals, 1 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, c. 0.5 mm long, thick or thin, glabrous; obtuse. Labellum basal appendages absent. Petals with posterior ones fused, A1+A2+(P1/P2). Anterior petals 3.3–3.5 mm long, 1.6–1.9 mm wide, entire, acute. Posterior petals 3.3–3.5 mm long, 1.5–1.7 mm wide, entire, obtuse. Column c. 7 mm long, of uniform width throughout, glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, c. 4 mm long excluding sepals, c. 2 mm wide; halves detaching distally, not recurved. Seeds not seen.

***Specimens examined*: Western Australia.** Galvins Gorge, c. 200 km E of Derby, Jul 1974, *Carr* 4175 & *Beauglehole* 47953 (DNA).

***Reconstituted or spirit material examined*:** *Carr* 4175 & *Beauglehole* 47953 (2 fls).

***Distribution and habitat*:** *S. rubriscapum* is endemic to the northern Kimberley of Western Australia (Map 7). It inhabits moist areas in grassy woodland.

***Phenology*:** Flowers and capsules have been recorded from July to September.

***Affinities*:** The linear leaves and floral features of *S. rubriscapum* place it clearly in *S.* sect. *Floodia*, but it differs from all other members of the group by its solitary inflorescences.

4. Stylidium rivulosum Lowrie & Kenneally, Nuytsia 11: 213 (1997). **Type:** Western Australia. On the road to Pago Mission (abandoned) from Honeymoon Beach on the margins of Unamon Creek, 14°06'S 126°43'E, 26 June 1994, *A. Lowrie* 1022 (holo: PERTH; iso: DNA, MEL).

Notes: No material of this species was available for examination. See Lowrie & Kenneally (1997) for a description and illustration.

***Distribution and habitat*:** *S. rivulosum* is endemic to the northern Kimberley of Western Australia (Map 2). It grows near creeks on skeletal sandstone or in shallow sandy soils.

5. Stylidium mucronatum Lowrie & Kenneally, Nuytsia 11: 206 (1997). **Type:** Western Australia. Grevillea Creek, c. 35 km NW of Beverley Springs Station, 16°33'S 125°10'E, 7 June 1995, *A. Lowrie* 1188 (holo: PERTH; iso: DNA, MEL).

Notes: No material of this species was available for examination. See Lowrie & Kenneally (1997) for a description and illustration.

***Distribution and habitat*:** *S. mucronatum* is endemic to the Kimberley region of Western Australia (Map 6). It grows on creekbanks in sandy soil.

6. Stylidium floodii F.Muell., Fragm. 1: 149 (1859); *Candollea floodii* (F.Muell.) F.Muell., Syst. Census Austral. Pl. 86 (1883). **Type:** Northern Territory. Roper River, Gulf of Carpentaria, [14° —'S 134° —'E], July 1856, *F. Mueller* (lecto: MEL, fide Kenneally & Lowrie, 1994).

Herbaceous annual, 8–20 cm high. Glandular hairs 0.15–0.2 mm long; glands ellipsoidal. Stems present or absent (with leaves in basal rosette), glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below, linear, 22–35 mm long including petiole (if any), 0.3–0.7 mm wide, glabrous, apex obtuse or acute or acuminate, base truncate, margins entire. Petioles absent. Scapes 1–12 per plant, 0.3–1 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 5–17 cm long including scape, determinate, monochasially cymose or determinate, dichasially cymose; branches glandular-hairy. Bracts linear or deltate or ovate, 1.5–4 mm long, glabrous or glandular-hairy, obtuse or acute or mucronate. Bracteoles absent. Pedicels 2–9 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate, all free, 0.9–1.7 mm long, 0.3–0.6 mm wide, glandular-hairy, obtuse. Corolla pink, glandular-hairy on tube and petals; tube 1.3–2.7 mm long, with sinus on anterior side only. Paracorolla continuous, lobed, thin, glabrous, 0.2–0.5 mm high. Paracorolla lobes or appendages 4 or 5, all similar, obtuse, 2 opposite the anterior petals, 2 or 3 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.3–0.7 mm long, thick, glabrous or glandular-hairy, obtuse or acute. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 0.9–2.2 mm long, 0.5–1.2 mm wide, entire, obtuse. Posterior petals 1.5–3.3 mm long, 0.9–1.9 mm wide, entire, obtuse. Column 5–8 mm long, of uniform width throughout, with eglandular hairs; lateral lobes absent; spur absent. Stigma sessile. Corona absent or not extending beyond anthers. Capsule ellipsoidal, without raised ribs, 2–2.9 mm long excluding sepals, 1.1–1.8 mm wide; halves detaching distally, not recurved. Seeds globose, 0.2–0.25 mm long, brown, smooth or colliculate.

Specimens examined**:** **Northern Territory**. 21 km N of Limmen Bight River, Sep 1986, *Clark* 687 (BRI, DNA); Arnhem Land, Koolatong River crossing, Numbulwar Rd, Oct 1987, *Clark* 1622 (DNA); Amungee Mungee waterhole, May 1991, *Cowie* 1819 & *Wilson* (DNA); Koolatong River, near road crossing, Oct 1996, *Cowie* 7360 (DNA); Ngukurr, 20 km NE crossing of Turkey Lagoon Creek, Aug 1987, *Russell-Smith* 3082 & Lucas (BRI, DNA); 3 km S of Bing Bong homestead, May 1984, *Thomson* 517 (DNA); Lake Eames area, 1 km east, Vanderlin Island, Jul 1988, *Thomson* 2499 (DNA). **Queensland**. Burke District: Richmond-Croydon road, 76.8 km S of "Esmeralda", Jul 1998, *Bean* 13443 (BRI); Richmond-Croydon road, 47.9 km N of "Esmeralda", Jul 1998, *Bean* 13470 (BRI, DNA); Croydon, Aug 1936, *Blake* 12472 (BRI); Adel's Grove, via Camooweal, Jun 1950, *De Lestang* 475 (BRI); 89 km W of Croydon, on road to Normanton, Jun 1991, *Halford* Q492 (BRI); Gulf Highway, 108 km SE of Normanton, Jul 1974, *Ollerenshaw* 1482 et al. (BRI, CANB); 23 km NW of "Old Corinda" station, along the Doomadgee-Woologorang road, May 1974, *Pullen* 9119 (BRI, CANB). Cook District: One Hundred Mile swamp, near Undara resort, E of Mt Surprise, Jul 1998, *Bean* 13760 & *Fox* (BRI); 37 km SSW of "Lyndhurst" HS and 1 km E of highway, Aug 1976, *Lazarides* 8171 (BRI, CANB); 16 km W of Georgetown, May 1976, *Scarth-Johnson* 152A (BRI). North Kennedy District: c. 4 miles [6 km] E of Wairuna and c. 0.5 miles [0.8 km] south scarp facing Burdekin, Aug 1967, *Morain* 185 (BRI).

Reconstituted or spirit material examined**:** *Bean* 13443 (2 fls)*; Halford* Q492 (3 fls)*; Morain* 185 (3 fls); *Pullen* 9119 (3 fls).

Distribution and habitat**:** *S. floodii* occurs in the area surrounding the Gulf of Carpentaria, including north-eastern Northern Territory, and north Queensland as far east as 'Wairuna', west of Cardwell (Map 1). It grows in damp sandy soil, in woodland dominated by *Melaleuca viridiflora* or *Eucalyptus* spp., or along creekbanks.

Phenology**:** Flowers and capsules have been recorded from May to October.

Conservation status**:** A widespread species which is not considered to be at risk.

7. Stylidium symonii Carlquist, Aliso 9: 439 (1979). **Type:** Northern Territory. At old B.H.P. flying field, Arnhem Land, 12°54'S 135°28'E, 17 June 1972, *D.E. Symon* 7731 (holo: DNA).

Notes: No material of this species was available for examination. See Carlquist (1979) for a description.

Distribution and habitat**:** *S. symonii* is known only from the type locality in north-eastern Arnhem Land (Map 2). Habitat is unknown.

8. Stylidium delicatum A.R.Bean **sp. nov.** S. floodii affinis, a quo foliis brevioribus, columna glabra vel pilis glandulosis longioribus et sepalis apice acuto ad mucronato differt. **Typus:** Queensland. Cook District: 2.8 km along new Pennefather River road, N of Weipa, 12°20'S 141°53'E, 11 July 1998, *A.R. Bean* 13579 (holo: BRI (1 sheet + spirit); iso: DNA, MEL, NSW).

Stylidium sp. (Sanamere Lagoon J.R. Clarkson 6175) in Henderson (1997).

Herbaceous annual, 10–20 cm high. Glandular hairs 0.3–0.5 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below, linear, 10–25 mm long, 0.3–0.7 mm wide, glabrous, apex acuminate, base truncate, margins entire. Petioles absent. Scapes 1–6 per plant, 0.3–0.5 mm in diameter, glandular-hairy. Sterile bracts absent or present. Inflorescences 3.5–13 cm long including scape, determinate, monochasially or dichasially cymose; branches glandular-hairy. Bracts deltate or lanceolate, 1–4 mm long, glandular-hairy, mucronate. Bracteoles absent. Pedicels 3–7 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate or elliptical, all free or with 3 free and 2 mostly fused, 1.3–2 mm long, 0.3–0.6 mm wide, glandular-hairy, acute. Corolla pink, glandular-hairy on tube and petals; tube 2.4–3 mm long, with sinus on anterior side only. Paracorolla continuous, lobed, thin, glabrous, 0.3–0.8 mm high. Paracorolla lobes or appendages 3–5, all similar, acute or obtuse, 0–2 opposite the anterior petals, 2 or 3 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.5–0.7 mm long, thick, glabrous or glandular-hairy, obtuse or acute. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 1.3–2.6 mm long, 0.9–1.5 mm wide, entire, obtuse. Posterior petals 2–4 mm long, (1.2–)1.8–2.7 mm wide, entire, obtuse. Column 5–7 mm long, of uniform width throughout, glabrous or glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule obconical or ellipsoidal, without raised ribs, 2.5–3 mm long excluding sepals, 1.2–1.7 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.2–0.25 mm long, brown, smooth and lacunose. Fig. 1 A-D.

***Specimens examined*:** **Queensland.** COOK DISTRICT: Vyce's Crossing c. 13 km due north of Weipa, Jul 1998, *Bean* 13574 (AD, BRI, DNA, MEL, NSW, QRS); Brown's Creek, Pascoe River, Jul 1948, *Brass* 19548 (A, BRI); c. 26 km SSW of Aurukun and 3 km W of Archer River, Oct 1982, *Clarkson* 4548; Cowal Creek crossing on the Bamaga to Mutee Head road, Sep 1985, *Clarkson* 6208 (BRI, QRS); Sanamere Lagoon, c. 3 km N of the Jardine River crossing on road to Bamaga, Aug 1985, *Clarkson* 6175 (BRI); 3.6 km S of old road crossing of Jardine River, Jul 1992, *Clarkson* 9698 & *Neldner* (BRI, DNA, MBA); Site 13, Pennefather River, Jul 1988, *Dalliston* CC276 (BRI); Sandy Creek, 69 km from Weipa on road to Stones Crossing, Jul 1993, *Forster* PIF13502 & *Sankowsky* (BRI); east arm of Namaleta Creek, upstream of Venture Mine lease, Oct 1994, *Gunness* AG2404 (BRI); along Kennedy road, c. 18 km N of Moreton Telegraph Station, Aug 1978, *Kanis* 2042 (BRI, CANB, L); Lake Boronto, 25 km NE of Bamaga, Aug 1978, *Paijmans* 3042 (BRI, CANB); Pascoe River, Sep 1990, *Sankowsky* 1154 & *Sankowsky* (BRI); Bamaga and tip of Cape York, Sep 1980, *Scarth-Johnson* 1043A (BRI, DNA); 13.5 km ENE of Weipa Mission, Jul 1974, *Specht* W433 & *Salt* (BRI); Schramm Creek, branch of Batavia River, undated, *Whitehouse* s.n. (BRI).

***Reconstituted or spirit material examined*:** *Bean* 13574 (2 fls); *Bean* 13579 (2 fls); *Clarkson* 4548 (2 fls); *Clarkson* 4896 (2 fls); *Clarkson* 6175 (1 fl); *Clarkson* 6208 (2 fls); *Clarkson* 9698 & *Neldner* (2 fls); *Forster* 13502 & *Sankowsky* (2 fls).

***Distribution and habitat*:** *S. delicatum* is endemic to northern Cape York Peninsula, north from about Aurukun (Map 5). It is recorded from swamp margins, *Melaleuca* woodland or open heathland, usually on sandy soil, but also recorded from clay-loam.

***Phenology*:** Flowers and capsules have been recorded from July to October.

***Affinities*:** *S. delicatum* is closely related to *S. floodii*, but differs by its leaves 10–25 mm long (22–35 mm for *S. floodii*); glandular hairs 0.3–0.5 mm long (0.15–0.2 mm for *S. floodii*); acute to acuminate sepals (obtuse for *S. floodii*); and the glabrous or glandular-hairy column (column with eglandular hairs only for *S. floodii*).

S. delicatum differs from *S. rivulosum* by its longer, acute sepals; 3–5 lobed paracorolla (2–lobed for *S. rivulosum*); the free posterior petals and the shorter column of uniform width throughout and lacking eglandular hairs.

***Conservation status*:** A widespread species which is not considered to be at risk.

***Etymology*:** The specific epithet is from the Latin *delicatus*, meaning delicate or dainty, in reference to the overall appearance of the plant.

9. Stylidium turbinatum Lowrie & Kenneally, Nuytsia 11: 215 (1997). **Type:** Western Australia. 1.5 km ESE of the Elephant Rock end of the Sleeping Buddha hill formation south of Kununurra, 15°50'S 128°46'E, 25 April 1995, *A. Lowrie* 1095 (holo: PERTH n.v.; iso: DNA, MEL).

Herbaceous annual, 6–16 cm high. Glandular hairs 0.15–0.25 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below, linear, 10–23 mm long, 0.3–0.7 mm wide, glabrous, apex acute or mucronate, base truncate, margins entire. Petioles absent. Scapes 1–10 per plant, 0.3–0.5 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 6–10 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts linear or deltate, 1–2.5 mm long, glandular-hairy, acute or mucronate. Bracteoles absent. Pedicels 3–8 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate, all free, 1.2–1.9 mm long, 0.5–0.8 mm wide, glandular-hairy, obtuse or acute. Corolla pink, glandular-hairy on tube and petals; tube 1.6–2 mm long, with sinus on anterior side only. Paracorolla continuous, lobed, thin, minutely papillose, 0.3–0.4 mm high. Paracorolla lobes or appendages 3–6, all similar, acute or obtuse, 0–2 opposite the anterior petals, 2–4 opposite the posterior petals. Paracorolla glands absent. Labellum attached

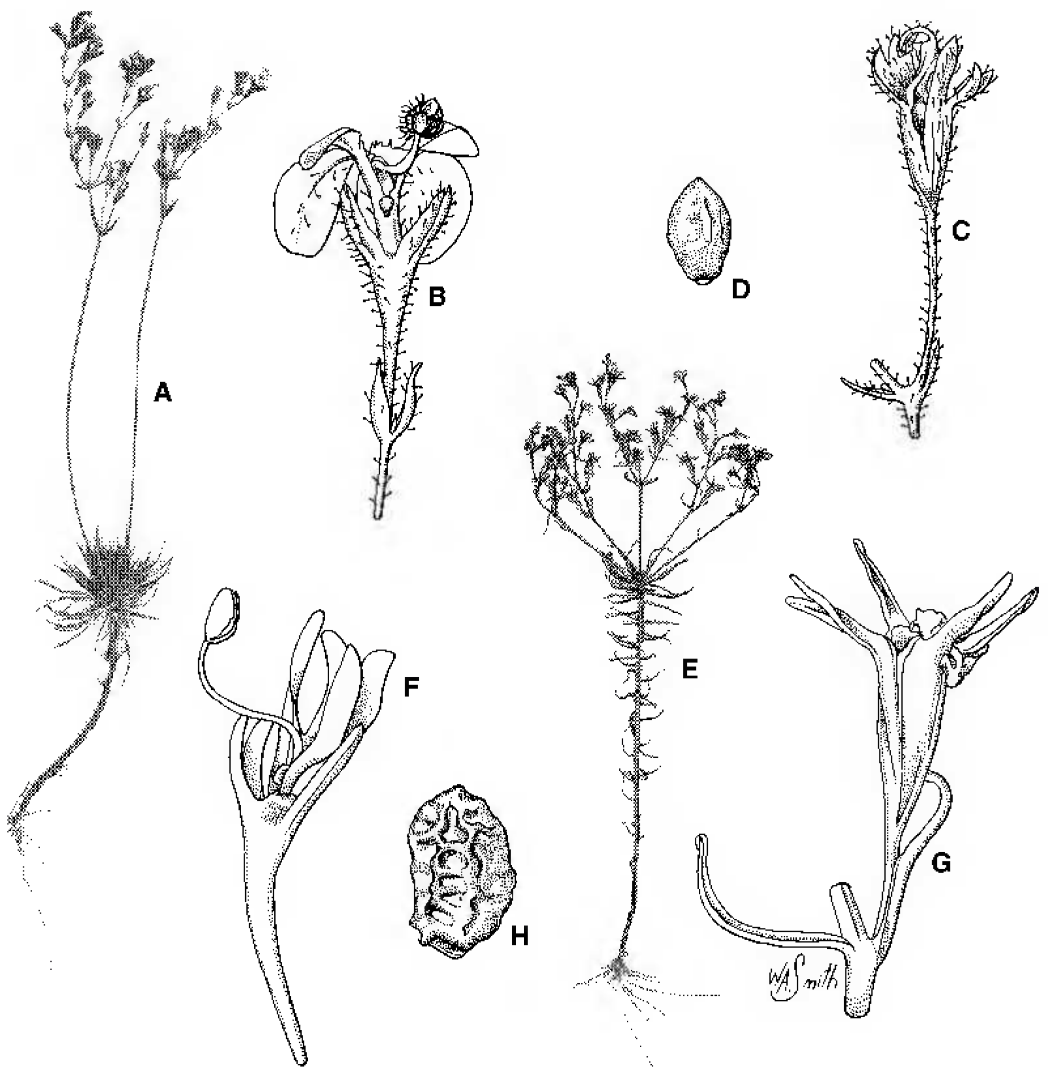

Fig 1. ***Stylidium delicatum*** A. whole plant x 1. B. lateral view of flower x 5. C. dehiscing capsule x 5. D. seed x 50. ***Stylidium foveolatum***. F. whole plant x 0.5. G. lateral view of flower x 5. H. capsule x 5. I. seed x 25. A,C,D from *Gunness* AG2404; B from *Clarkson* 9698; E from *Forster* 22591 & *Booth*; F-I from *Gunness* AG2303.

at base of anterior sinus of corolla tube, ovate, 0.5–0.6 mm long, thick, glabrous or glandular-hairy, obtuse. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2 or posterior ones fused, A1+A2+(P1/P2). Anterior petals 2–3 mm long, 1.3–2 mm wide, entire, acute or obtuse. Posterior petals 2.8–4 mm long, 1.9–3 mm wide, bilobed or entire, obtuse. Column 5–7.5 mm long, slightly dilated near distal end, with glandular and eglandular hairs; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule obconical, with 5 raised ribs, 2.2–3.3 mm long excluding sepals, 1.7–2 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.2–0.25 mm long, yellow or brown, smooth.

***Selected specimens*:** **Western Australia**. c. 32 km WSW of Kununurra, Jul 1976, *Beauglehole* 54296 (DNA); S side of Cockburn Range, c. 6.5 km W of King R., Jul 1974, *Carr* 3405 & *Beauglehole* 47183 (DNA). **Northern Territory**. Survey Creek, Daly River road, May 1968, *Byrnes* NB661 (DNA); Stuart Highway, 40 km S of Darwin, Jun 1977, *Carlquist* 15178 (DNA); Site 55, Mary River, May 1989, *Clark* 1751 (DNA); tributary of Allia Ck, May 1994, *Cowie* 4886 & *Albrecht* (DNA); 9.5 km S of Twin Fall, May 1980, *Craven* 5858 (CANB, DNA); 65 km NE of Pine Creek, May 1977, *Dunlop* 4560 (DNA, NSW); Mt Gilruth area, Jun 1978, *Dunlop* 4911 (DNA); Koolpinyah station, May 1996, *Egan* 5331 (DNA); Magela Creek at Mudginberry, May 1973, *Hartley* 13874 (DNA); c. 8 miles [13 km] SSW of Oenpelli-Pine Creek intersection, Jul 1973, *Henry* 890 (DNA); Radon Gorge area, c. 12 km S of Jabiru, Jun 1978, *Latz* 7693 (BRI, CANB, DNA); Tortilla Flats, Apr 1974, *Parker* 410 (DNA); Flying Fox Creek, Arnhem Hwy, Jun 1977, *Parker* 899 (CANB, DNA); 4 km W of Nabarlek airstrip, Oenpelli road, Apr 1979, *Rankin* 2141 (DNA, PERTH); Howard River area, Aug 1979, *Rankin* 2230 (DNA); Munmarlary turnoff, Arnhem Highway, Jun 1983, *Rankin* 2726 (DNA); Koongarra, Jun 1978, *Rice* 2686 (DNA); Kakadu N.P., upper Koolpin Creek, Jun 1988, *Russell-Smith* 5530 & *Lucas* (BRI, DNA).

***Reconstituted or spirit material examined*:** *Dunlop* 4560 (1 fl); *Parker* 899 (1 fl); *Rankin* 2141 (2fls).

***Distribution and habitat*:** *S. turbinatum* is distributed from the Kununurra area of Western Australia to the Arnhem Land plateau in Northern Territory (Map 2). It grows on sandstone plateaux, on moist flats or near creeks. Soils are sandy and associated species may include *Eucalyptus ptychocarpa* F.Muell., *E. polycarpa* F.Muell., *Melaleuca* spp. and *Pandanus spiralis* R.Br.

***Phenology*:** Flowers and capsules have been recorded from April to August.

***Affinities*:** *S. turbinatum* differs from *S. floodii* by the minutely papillose paracorolla (glabrous for *S. floodii*), the anterior petals 1.3–2 mm wide (0.5–1.2 for *S. floodii*), the column slightly dilated near distal end and with glandular and eglandular hairs (uniform width throughout and with eglandular hairs for *S. floodii*) and the capsule obconical and conspicuously angled (ellipsoidal and not angled for *S. floodii*).

10. Stylidium costulatum Kenneally & Lowrie, Nuytsia 9: 343-345 (1994). **Type:** Western Australia. Wonganut Spring, 19 km ESE of Coulomb Point, Dampier Peninsula, 17°25'S 122°19'E, 18 June 1984, *K.F. Kenneally* 9054/A (holo: PERTH n.v.; iso: MEL).

Herbaceous annual, 5–15 cm high. Glandular hairs 0.2–0.3 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below, linear, 7–26 mm long, 0.5–0.8 mm wide, glabrous, apex acute or acuminate, base truncate, margins entire. Petioles absent. Scapes 1–8 per plant, 0.4–0.7 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 2–10 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts linear or lanceolate, 1–4 mm long, glandular-hairy, acute. Bracteoles absent. Pedicels 3–9 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate or elliptical, with 3 free and 2 mostly fused, 1.5–2 mm long, 0.6–0.7 mm wide, glandular-hairy, acute. Corolla yellow, glandular-hairy on tube and petals; tube 1.7–2.2 mm long, with sinus on anterior side only. Paracorolla discontinuous, lobed, thick, glabrous, 0.2–0.3 mm high. Paracorolla lobes or appendages 2, all similar, obtuse, 2 opposite the anterior petals, none opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.4–0.6 mm long, thick or thin, glabrous or glandular-hairy, obtuse. Labellum basal appendages absent. Petals with posterior ones fused, A1+A2+(P1/P2). Anterior petals 1.8–2.5 mm long, 1.2–1.5 mm wide, entire, obtuse. Posterior petals 2.8–3 mm long, 1.4–1.7

mm wide, entire, obtuse. Column 5–6.5 mm long, slightly dilated near distal end, glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule obconical or ellipsoidal, with 5 raised ribs, 3–4.5 mm long excluding sepals, 1.5–2 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, c. 0.2 mm long, brown, smooth or colliculate.

Specimens examined**: Western Australia.** 59 km by road N of Gibb River road, Meda-Oobagooma road, c. 60 km NE of Derby, Jun 1976, *Beauglehole* 52685 (DNA); Wonganut Spring, 19 km ESE of Coulomb Point, Dampier Peninsula, Jun 1984, *Forbes* 2372 (MEL).

Reconstituted or spirit material examined**:** *Beauglehole* 52685 (1 fl); *Forbes* 2372 (3 fls).

Distribution and habitat**:** *S. costulatum* is endemic to the western parts of the Kimberley in Western Australia (Map 1). It grows adjacent to creeks in seasonally wet areas.

Phenology**:** April to August, according to Kenneally & Lowrie (1994).

Affinities**:** *S. costulatum* is closely related to *S. turbinatum*, but differs by having 2 sepals mostly fused (all sepals free for *S. turbinatum*), corolla yellow (pink for *S. turbinatum*), paracorolla discontinuous, glabrous, 2-lobed (continuous, papillose, 3–6 lobed for *S. turbinatum*), posterior petals 1.4–1.7 mm wide (1.9–3 mm for *S. turbinatum*) and column with glandular hairs only (glandular and eglandular for *S. turbinatum*).

11. Stylidium desertorum Carlquist, Aliso 9: 317 (1978). **Type:** Northern Territory. Salt Beef Lake, Tanami, 20°53'S 130°25'E, 22 July 1973, *P.K. Latz* 4085 (holo: AD; iso: BRI).

Herbaceous perennial, 15–26 cm high. Glandular hairs 0.3–0.7 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below, linear, (11–)16–75 mm long, 0.3–0.8 mm wide, glabrous, apex mucronate, base truncate, margins entire. Petioles absent. Scapes 1–6 per plant, 1–2.3 mm in diameter, glandular-hairy. Sterile bracts absent or present. Inflorescences 13–20 cm long including scape, determinate, monochasially cymose or determinate, dichasially cymose; branches glandular-hairy. Bracts linear or deltate or ovate, 1–5 mm long, glandular-hairy, acute or mucronate. Bracteoles absent. Pedicels 2–9 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate or elliptical, all free, 2.2–2.7 mm long, 0.7–0.8 mm wide, glandular-hairy, obtuse or acute. Corolla pink, glandular-hairy on tube and petals; tube 4.2–5.5 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, ovate or orbicular, 0.4–1 mm long, thick, glandular-hairy, obtuse or acuminate. Labellum basal appendages less than half length of labellum or more than half length of labellum, glabrous or minutely papillose. Petals all free, A1+A2+P1+P2. Anterior petals 2.2–4 mm long, 0.8–1.8 mm wide, entire, obtuse. Posterior petals 3–5 mm long, 1–2.2 mm wide, entire, obtuse. Column 11–15 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent or extending beyond anthers. Capsule obconical or ellipsoidal, without raised ribs, 3.5–4.7 mm long excluding sepals, 1.7–2.5 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, 0.2–0.25 mm long, brown, smooth or colliculate.

Selected specimens**: Western Australia.** Kimberley Division, 19°52'S 125°15'E, May 1984, *Fatchen* 960 (AD); Red Dune site, near Edgar Range, SE of Broome, Aug 1976, *Kenneally* 5572 (MEL, PERTH); N of Balgo Mission, Jul 1973, *Latz* 4042 (DNA). **Northern Territory**. c. 84 km WNW of Green Swamp well, Tanami Desert, Aug 1995, *Albrecht* 6973 (DNA, NT); 9.6 miles [15.4 km] N of Georgina Downs HS, Oct 1957, *Chippendale* 3813 (AD, BRI, DNA, MEL); Ooratippra Stn, Sandover Hwy, Arganara Creek, Aug 1979, *Henshall* 2718 (DNA, MEL); 12 [miles?] SE Rabbit Flat, Jul 1973, *Latz* 3946 (BRI, CANB, DNA, PERTH); north-west Simpson Desert, Nov 1973, *Latz* 4422 (AD, CANB, DNA, NSW); Elliott, May 1975, *Latz* 5971 (AD, DNA, NT); Phillips Creek station (Old Mission), Jun 1975, *Latz* 6045 (AD, DNA); 2 km N of Wauchope roadhouse, Stuart Highway, Jun 1978, *Latz* 7831 (DNA); Kurluparranka Soak, Lander River floodout, Aug 1991, *Latz* 12142 (MEL, NT); Thring swamp, Singleton station, Jun 1975, *Ulyatt* 28 (DNA, PERTH); 16 km W of McLaren Creek station, Nov 1984, *Waugh* s.n. (DNA); on Barkly Hwy 70 km NW of Barrys Caves near Radio repeater 8406, Sep 1981, *Whaite* 3934 (DNA, NSW); 50 km S of Kalkarindji, Aug 1993, *Wightman* 6187 (DNA).

Queensland. Burke District: Selwyn Ranges, grid ref. 7054-607993, Jul 1991, *Conroy* 89 & *Taylor* (BRI); 10 km S of Mt Isa, Feb 1985, *Harris* 40 (BRI). Mitchell District: Haughton Vale, Jundah, Sep 1997, *Groves* AZI 1530 (BRI). Gregory North District: 6 km NNW of "Badalia", Sep 1977, *Purdie* 1105 (BRI). Gregory South District: 60 km E of Nappamerrie, Aug 1995, *Guy* s.n. (AD).

Reconstituted or spirit material examined: *Conroy* 89 & *Taylor* (2 fls); *Latz* 3946 (1 fl); *Wightman* 6187 (2 fls).

Distribution and habitat: *S. desertorum* has a scattered distribution in the semi-arid areas of Queensland, Northern Territory and Western Australia (Map 3). It grows adjacent to seasonal swamps or in areas which receive water runoff, or on sandplains in association with *Triodia* spp. Soils are usually sandy, but clays and clay-loams will also support the species.

Phenology: Flowers and capsules have been recorded from May to December.

Affinities: *S. desertorum* is closely related to *S. floodii*, but differs by the glandular hairs 0.3–0.7 mm long (0.15–0.2 mm for *S. floodii*), the sepals 2.2–2.7 x 0.7–0.8 mm (0.9–1.7 x 0.3–0.6 mm for *S. floodii*), corolla tube 4.2–5.5 mm long (1.3–2.7 mm for *S. floodii*) and basal appendages present on labellum (absent for *S. floodii*).

Conservation status: A widespread species which is not considered to be at risk.

12. Stylidium adenophorum Lowrie & Kenneally, Nuytsia 11: 199 (1997). **Type:** Western Australia. Mount Barnett Roadhouse picnic grounds, Kimberley, 16°45'S 125°56'E, 11 June 1995, *A. Lowrie* 1227 (holo: PERTH n.v.; iso: DNA, MEL).

Herbaceous annual, 10–20 cm high. Glandular hairs 0.2–0.4 mm long; glands ellipsoidal. Stems present, glabrous. Leaves 20–200 per plant, mostly in terminal rosette, with some scattered below or scattered along stems, linear, 13–25 mm long, 0.3–0.6 mm wide, glandular-hairy, apex obtuse, base truncate, margins entire. Petioles absent. Scapes 1–20 per plant, 0.5–0.8 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 10–18 cm long including scape, determinate, monochasially cymose or determinate, dichasially cymose; branches glandular-hairy. Bracts lanceolate or ovate, 1–3 mm long, glandular-hairy, obtuse or acute. Bracteoles absent. Pedicels 4.5–16 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate or ovate, all free, 0.9–1.6 mm long, 0.5–0.7 mm wide, glandular-hairy, obtuse or acute. Corolla pink, glandular-hairy on tube and petals; tube 2.2–4 mm long, with sinus on anterior side only. Paracorolla discontinuous, lobed, thin, glabrous, 0.2–0.8 mm high. Paracorolla lobes or appendages 4–7, dimorphic, acute or obtuse, 2 opposite the anterior petals, 2–5 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.5–0.7 mm long, thick, glabrous or glandular-hairy, obtuse or acute. Labellum basal appendages absent. Petals with posterior ones fused, A1+A2+(P1/P2). Anterior petals 2–3.5 mm long, 0.8–1.9 mm wide, entire, obtuse. Posterior petals 2.5–4.5 mm long, (1.2–)1.9–3 mm wide, bilobed or entire, obtuse. Column 7–8 mm long, slightly dilated near distal end, with glandular and eglandular hairs; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 2.4–4.5 mm long excluding sepals, 1.7–2.1 mm wide; halves detaching distally, not recurved. Seeds globose, 0.2–0.25 mm long, brown, smooth.

Selected specimens: **Western Australia**. Wolf Creek Meteorite Crater, c. 85 km S of Halls Creek, Jul 1974, *Carr* 3592 & *Beauglehole* 47370 (DNA); Mount Brophy Springs, Gardner Range, 190 km SE of Halls Creek, Jul 1995, *Coate* 374 (BRI, DNA); Mt Parker Plateau, Jul 1991, *Cowie* 1990 (DNA); Camp Creek, Mitchell Plateau, 1 km N of Amax camp, May 1993, *Cowie* 4329 & *Brubaker* (CANB, DNA, PERTH); Claypan 5 km E of McHughs Bore, on track to Logues Springs, Aug 1976, *Kenneally* 5777 (BRI, PERTH); King Leopold Ranges, 8.5 miles [13.6 km] SE of Bedford Downs station, Jul 1959, *Lazarides* 6388 (BRI, CANB); 39 miles [62 km] SW of Gibb River station, May 1967, *Maconochie* 205 (DNA). **Northern Territory**. 36 km W of Cape Crawford, Carpentaria Hwy, May 1991, *Cowie* 1736 & *Wilson* (DNA); Barkly Tableland, upper Nicholson River area, Jun 1974, *Kanis* 1720 (CANB, DNA); Wessel Islands, Oct 1972, *Latz* 3520 (DNA); c. 27 km SW of "Calvert Hills" on the road to "Creswell Downs", May 1974, *Pullen* 9252 (CANB, DNA); Kilgour Gorge, Mallapunyah station, May 1984, *Thomson* 583 (DNA). **Queensland**. Burke District: Richmond-Croydon road, 34.6 km S of "Esmeralda", Jul 1998, *Bean* 13455 (BRI, NSW); Westmoreland, Little Amphitheatre, May 1997, *Forster* PIF21144 & *Booth* (BRI, DNA). Cook District: 13.7 km N of Wakooka, north of Cooktown, Jul 1998, *Bean* 13658 (BRI, DNA, MEL, NSW); 36.3 km from Dixie station on the track to Killarney, Jun 1989, *Clarkson* 8153 & *Neldner* (BRI); 0.9 km W of Marmoss Creek, 25.1 km E of Kerr Point, Weipa, Apr 1991, *Clarkson* 9022 & *Neldner* (BRI, K, MBA, PERTH); 6 km N of Lilyvale on the track to Running Ck, Jun 1993, *Clarkson* 10096 & *Neldner* (BRI, MBA, PERTH); Bulleringa N.P., 80 km NW of Mt Surprise, Apr 1998, *Forster* 22560 & *Booth* (BRI); 24 km S of Wakooka Outstation, May 1993, *Neldner* 4050 (BRI, DNA, K, MBA, MEL, NSW, PERTH). North Kennedy District: 22.5 km SW of Pentland, Aug 1997, *Bean* 12275 (BRI, MEL); near Reeve's Lake, c. 25 km W of junction of Lolworth Creek and Burdekin River, NW of Charters Towers, Jul 1981, *Henderson* H2657 (BRI, CANB, K, MO). South Kennedy District: southern end of Lake Buchanan, Oct 1974, *Althofer* 660 (BRI); 0.6 km S of Oxenhope Outstation, May 1991, *Neldner* 3172 & *Thompson* (BRI). Mitchell District: "Rangeside", 10-18 km E of Torrens Creek, Apr 1981, *Rebgetz* 748 (BRI).

Reconstituted or spirit material examined: *Bean* 12275 (2 fls); *Bean* 13658 (1 fl); *Clarkson* 8153 & *Neldner* (2 fls); *Clarkson* 9022 & *Neldner* (2 fls); *Clarkson* 10096 & *Neldner* (2 fls); *Forster* 22560 & *Booth* (1 fl); *Neldner* 4050 (1 fl).

Distribution and habitat: *S. adenophorum* is distributed across northern Australia, from the western Kimberley to Cape York Peninsula, and in Queensland, south as far as Lake Buchanan (Map 4). It grows in sandy soil in seasonally wet *Melaleuca* or *Eucalyptus* woodland, but where the surface soil is often quite dry when the species reaches maturity.

Phenology: Flowers and capsules have been recorded from April to October.

Affinities: *S. adenophorum* is related to *S. floodii*, but differs by the glandular-hairy leaves (glabrous for *S. floodii*), discontinuous paracorolla with dimorphic lobes (continuous and lobes all similar for *S. floodii*), posterior petals partly fused (all petals free for *S. floodii*) and column with glandular and eglandular hairs (eglandular only for *S. floodii*).

Conservation status: A widespread species which is not considered to be at risk.

Stylidium sect. **Debilia** Mildbr., Pflanzenr. 35: 41 (1908) as "Debiles". **Type:** *S. debile* F.Muell.

Rootstock cylindrical. Leaves oblanceolate, elliptical or obovate, borne on terminal rosette and/or cauline. Glandular hairs present, glands ellipsoidal or capitate. Inflorescence determinate; flowers pedicellate; corolla tube with sinus on anterior side only or on both sides; petals entire and obtuse, all free; labellum usually attached at base of anterior sinus, basal appendages present or absent. Paracorolla present or absent. Column lateral lobes absent; spur absent. Anther cells 4. Stigma sessile. Capsule obovoid to obconical; seeds globose to ellipsoidal, brown.

10 species endemic to northern and eastern Australia

13. Stylidium semipartitum F.Muell., Fragm. 1: 147 (1859). **Type:** [Northern Territory]. In pascuis aridis ad flumen Victoriae, [15° —'S 129°—'E], in 1855, *F. Mueller*, *n.v.*

S. leptorrhizum var. *pilosum* Benth., Fl. Austral. 4: 16 (1868). **Type:** Van Diemen's Gulf, NW Coast, *A. Cunningham*, n.v.

[*S. leptorrhizum* auct. non F.Muell.]

Herbaceous annual or perennial, 9–40 cm high. Glandular hairs 0.2–0.5 mm long; glands ellipsoidal. Stems present, glandular-hairy. Leaves 10–30 per plant, mostly in terminal rosette, with some scattered below or scattered along stems, oblanceolate or elliptical or obovate, 11–50(–68) mm long including petiole, 3–21 mm wide, glandular-hairy, apex obtuse or acute, base obtuse or cuneate, margins entire. Petioles 5–20(–28) mm long. Scapes 1–18 per plant, 0.3–1 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 8–30 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts deltate or lanceolate, 1–4 mm long, glandular-hairy, acute. Bracteoles absent. Pedicels 4–19 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate or ovate, all free, 0.9–1.7 mm long, 0.4–0.6 mm wide, glandular-hairy, acute. Corolla pink or mauve or red, glandular-hairy on tube and petals; tube 2.2–2.7 mm long, with sinus on anterior side only. Paracorolla discontinuous, lobed, thin, glabrous, 0.2–1.1 mm high. Paracorolla lobes or appendages 2 or 4, dimorphic, acute or obtuse, (0–)2 opposite the anterior petals, 2 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate or lanceolate, 0.4–0.7 mm long, thick or thin, glabrous or glandular-hairy, obtuse or acute. Labellum basal appendages absent. Petals with posterior ones fused, A1+A2+(P1/P2). Anterior petals 1.5–3.5 mm long, 0.6–1.9 mm wide, entire, acute or obtuse. Posterior petals 2.5–4.2 mm long, 1.5–2.8 mm wide, entire, obtuse. Column 5.5–7 mm long, of uniform width throughout, with eglandular hairs; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 2.5–6.2 mm long excluding sepals, 1.5–2.5 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, 0.25–0.3 mm long, brown, colliculate.

***Selected specimens*:** **Western Australia**. 59 km by road N of Gibb River road, Molta-Oobagooma road, c. 60 km NE of Derby, Jun 1976, *Beauglehole* 52680 (DNA); Curlew Bay, 7 km NW of One Arm Point, Dampier Peninsula, May 1991, *Carter* 459 (DNA, PERTH); St Patrick Is., St George Basin, May 1995, *Coate* 249A (DNA, PERTH); claypan 5 km E of McHughs Bore, on track to Logues Springs, Aug 1976, *Kenneally* 5777 (DNA, PERTH); Bunda Bunda Mill, 33 km NE of Coulomb Point, Dampier Peninsula, Jun 1984, *Kenneally* 9060 (DNA, PERTH); Matchbox Creek, on road to Ord Dam 19.9 km SW of Victoria Hwy, Jun 1993, *Lowrie* 779 (BRI). **Northern Territory**. Along road from Darwin Water Supply dam, 7 km from junction with Stuart Hwy, Jun 1978, *Carlquist* 15198 (BRI, DNA); 61.8 miles [99.5 km] SW of Katherine, May 1960, *Chippendale* 6798 (BRI); near Plot 27, Mount Douglas, Mount Bundy station, May 1989, *Clark* 1723 (BRI, DNA); Site 53, Mary River, May 1989, *Clark* 1761 (BRI, DNA); Nabarlek, Apr 1989, *Hinze* 510 (BRI, DNA); Melville Island, near mouth of Maclear River, Apr 1986, *Johnson* 4200 (BRI); Munmalary station, Apr 1973, *Latz* 3893 (BRI); 66 km N of Timber Creek, May 1994, *Latz* 13929 & *Dunlop* (CANB, DNA); near Koongarra Saddle, 1.5 km N of Koongarra, May 1980, *Lazarides* 8898 (BRI, CANB); Gunn Point, Apr 1973, *McKean* 1048 (BRI, CANB, DNA); Bridge Creek, Stuart Highway, May 1977, *Parker* 842 (BRI, CANB, DNA); South Alligator Mine area, 7 km SE of UDP Falls, Jun 1977, *Parker* 881 (BRI, CANB, DNA); Jim Jim Falls, Kakadu, Oct 1984, *Wightman* 1719 & *Dunlop* (BRI, CANB, DNA); Arnhem Land, 3 km SE of Ramingining, Jun 1987, *Wightman* 3874 & *Smith* (DNA).

***Reconstituted or spirit material examined*:** *Clark* 1761 (2 fls); *Craven* 6503 (1 fl); *Dunlop* 3396 (2 fls); *Wightman* 1719 & *Dunlop* (3 fls); *Lazarides* 8898 (1 fl).

***Distribution and habitat*:** *S. semipartitum* is widespead in the northern parts of Northern Territory and the Kimberley region of Western Australia (Map 5). It grows on damp sand in eucalypt woodland, on sandstone plateaux with *Triodia* spp. or near creeks with *Melaleuca* spp.

***Phenology*:** Flowers and capsules have been recorded from March to August, with one record in October.

***Notes*:** The type of *S. semipartitum* could not be located at MEL, nor at K or BM. Despite this, the application of the name is clear due to the detailed description provided by Mueller. In particular, he stated that *semipartitum* has “leaf margins glandular-ciliate” and “leaves crowded at the apex of a short to very short stem”. These character-states clearly distinguish it from *S. leptorrhizum.*

S. semipartitum was reduced to synonymy under *S. leptorrhizum* by Bentham (1868). Subsequently the name *S. leptorrhizum* was widely misapplied to the taxon with leaves on a stem, distinct petioles and glandular-hairy leaves, i.e. *S. semipartitum.*

***Affinities*:** *S. semipartitum* is distinctive within *S.* sect. *Debilia* because of its glandular-hairy leaves.

14. Stylidium leptorrhizum F.Muell., Fragm. 1: 148 (1859); *Candollea leptorrhiza* (F.Muell.) F.Muell., Syst. Census Austral. Pl. 86 (1883). **Type:** [Northern Territory]. near Macadams Range, [14°—’S 129°—’E], October 1855, *F. Mueller* (holo: MEL [MEL1061659]).

Stylidium barrettorum Lowrie & Kenneally, Nuytsia 11: 202 (1997), **syn. nov. Type:** Western Australia. Grevillea Creek, Beverley Springs Station, 31 May 1992, *M.D. Barrett* 4 (holo: PERTH; iso: DNA, MEL).

Herbaceous annual, 8–25 cm high. Glandular hairs 0.15–0.3 mm long; glands ellipsoidal. Stems absent (with leaves in basal rosette). Leaves 10–20 per plant, oblanceolate or elliptical, 14–39(–60) mm long including petiole, 3–9.5 mm wide, glabrous, apex acute or mucronate, base cuneate, margins entire. Petioles 3–13 mm long. Scapes 1–3 per plant, 0.4–0.8 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 8–25 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts lanceolate, 1.5–4 mm long, glandular-hairy, acute or mucronate. Bracteoles absent. Pedicels 4–16 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or ovate or elliptical, all free, 1–1.5 mm long, 0.5–0.8 mm wide, glandular-hairy, acute. Corolla pink or mauve, glandular-hairy on tube and petals; tube 3–3.5 mm long, with sinus on anterior side only. Paracorolla discontinuous, lobed, thin, glabrous, 0.8–1.5 mm high. Paracorolla lobes or appendages 2, both similar, acute or obtuse, opposite the anterior petals only. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.5–0.8 mm long, thick, glabrous; obtuse or acute. Labellum basal appendages absent. Petals with posterior ones fused, A1+A2+(P1/P2). Anterior petals 2.8–4 mm long, 1.8–2.5 mm wide, entire, obtuse. Posterior petals 3.2–5 mm long, 1.2–3 mm wide, entire, obtuse. Column 7–9.5 mm long, slightly dilated near distal end, with glandular and eglandular hairs; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 3.2–5 mm long excluding sepals, 2–2.2 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, c. 0.2 mm long, yellow or brown, smooth or colliculate.

***Specimens examined*:** **Western Australia.** King Edward River, c. 50 km NE of Mitchell River HS, Aug 1978, *Beauglehole* 29109 & *Errey* 2809 (DNA); 11 km E of junction of Gibb River-Drysdale-El Questro road, c. 195 km SW of Wyndham, May 1976, *Beauglehole* 51639 (DNA). **Northern Territory.** Spirit Hills Conservation area, near Victoria River, Aug 1996, *Boehme* 9 (DNA); Alligator Springs, Jul 1995, *Booth* 1078 (DNA).

***Reconstituted or spirit material examined*:** *Beauglehole* 29109 & *Errey* 2809 (2 fls); *Boehme* 9 (2 fls).

***Distribution and habitat*:** *S. leptorrhizum* grows in the Kimberley region of Western Australia and in the Victoria River district of Northern Territory (Map 3). It grows in sandy soil beside creeks or billabongs.

***Phenology*:** Flowers have been recorded from May to August; capsules from July to August.

***Typification*:** The type specimen of *S. leptorrhizum* has glabrous leaves, columns with glandular hairs, capsules 3–4 mm long, and broad acute sepals. Examination of the type of *S. barrettorum* reveals it is clearly conspecific with *S. leptorrhizum*.

***Affinities*:** *S. leptorrhizum* is closely related to *S. multiscapum*, but differs by the acute sepals (obtuse for *S. multiscapum*), corolla tube 3–3.5 mm long (1.4–2.5 mm for *S. multiscapum*), paracorolla lobes 2 (6–8 for *S. multiscapum*), labellum ovate and glabrous (orbicular and glandular-hairy for *S. multiscapum*), column with glandular and eglandular hairs (glabrous for *S. multiscapum*) and capsule 2–2.2 mm wide (1.4–1.7 mm for *S. multiscapum*).

15. Stylidium austrocapense A.R.Bean **sp. nov.** *S. multiscapae* affinis, sed foliis brevioribus angustioribusque, paracorolla deficienti, labello parti exterioro corollae afixo, appendicibus basalibus labelli plerumque praesentibus et seminibus majoribus, differens. **Typus:** Queensland. Cook District: c. 17 km ESE of Wolverton, c. 1.5 km S of Pratt Tin Mine, 13°24'S 143°02'E, 21 April 1993, *J.R. Clarkson* 9960 & *V.J. Neldner* (holo: BRI; iso: DNA, K n.v., MBA, PERTH n.v.).

Herbaceous annual, 9–18 cm high. Glandular hairs 0.2–0.4 mm long; glands ellipsoidal. Stems absent (with leaves in basal rosette). Leaves 4–40 per plant, oblanceolate or elliptical, 7.5–31 mm long including petiole, 2–10 mm wide, glabrous, apex acuminate or mucronate, base cuneate, margins entire. Petioles 1.5–7 mm long. Scapes 1–10 per plant, 0.3–0.7 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 9–18 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts ovate or deltate, 1–2 mm long, glandular-hairy, obtuse or acute or mucronate. Bracteoles absent. Pedicels 2–13 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate or elliptical, all free, 0.9–1.6 mm long, 0.4–0.7 mm wide, glandular-hairy, obtuse or acute. Corolla pink or red, glandular-hairy on tube and petals; tube 1.5–2.1 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached to outside of corolla tube, orbicular, 0.3–0.7 mm long, thick, glabrous or glandular-hairy, obtuse. Labellum basal appendages absent or present, less than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 2.4–3.5 mm long, 1.5–2.9 mm wide, entire, obtuse. Posterior petals 3–4.1 mm long, 1.9–3.5 mm wide, entire, obtuse. Column 5–7.5 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent or extending beyond anthers. Capsule ellipsoidal, without raised ribs, 2.2–3.7 mm long excluding sepals, 1.3–2 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, 0.25–0.3 mm long, yellow or brown, colliculate. Fig. 2 F-G.

***Specimens examined*: Queensland.** COOK DISTRICT: Emu Creek, 10.2 km from Peninsula Development road, towards 'Dixie', Jul 1998, *Bean* 13554 (BRI); 7.9 km S of Musgrave, on road to Laura, Jul 1998, *Bean* 13557 (BRI, DNA, MEL, NSW); 11.5 km west of the Laura to Musgrave road on the track to Dixie, Jun 1989, *Clarkson* 8119 & *Neldner* (BRI, MBA); 24.7 km N of the Morehead River on the Peninsula Development road, Apr 1991, *Clarkson* 8927 & *Neldner* (BRI, MBA); Bulleringa NP, 80 km NW of Mt Surprise, track to Red River past Donkey Spring, Apr 1998, *Forster* PIF22591 & *Booth* (BRI); 8 miles [13 km] E of Musgrave Telegraph Office, Jun 1968, *Pedley* 2659 (BRI).

***Reconstituted or spirit material examined*:** *Bean* 13554 (2 fls); *Bean* 13557 (2 fls); *Clarkson* 8119 & *Neldner* (3 fls); *Clarkson* 9960 & *Neldner* (3 fls); *Forster* 22591 & *Booth* (2 fls).

***Distribution and habitat*:** *S. austrocapense* is confined to Cape York Peninsula between 13°S and 17°30'S latitude (Map 3). It inhabits low hills or intermittant watercourses with coarse white sandy soil. The dominant species include *Eucalyptus tetrodonta, E. clarksoniana, Melaleuca viridiflora, M. nervosa* and *Xanthorrhoea johnsonii.*

***Phenology*:** Flowers and capsules have been recorded from April to July

***Affinities*:** *S. austrocapense* is closely related to *S. multiscapum* but differs by the leaves 7.5–31 mm long (22–52 mm for *S. multiscapum*), paracorolla absent (present for *S. multiscapum*), labellum attached to outside of corolla tube (attached at base of anterior sinus for *S. multiscapum*) and labellum basal appendages usually present (rarely present for *S. multiscapum*).

S. austrocapense differs from *S. leptorrhizum* by the petals all free (posterior ones fused in *S. leptorrhizum*); paracorolla absent (present, discontinuous in *S. leptorrhizum*); labellum attached to outside of corolla tube (base of anterior sinus in *S. leptorrhizum*); labellum basal appendages present (absent in *S. leptorrhizum*); column 5–6 mm long and glabrous (7–9.5 mm long with glandular and eglandular hairs in *S. leptorrhizum*).

***Conservation status*:** A widespread species which is not considered to be at risk.

***Etymology*:** The specific epithet refers to the occurrence of the species on the southern part of Cape York Peninsula.

16. Stylidium multiscapum O.Schwarz, Repert. Spec. Nov. Regni Veg. 24: 105 (1927). **Type:** Port Darwin, 6 miles [10 km] east, [12°2-'S 130°5-'E], undated, *F.A.K. Bleeser* 360 (holo: B, destroyed; iso: NSW).

Herbaceous annual, 10–20 cm high. Glandular hairs 0.2–0.5 mm long; glands ellipsoidal. Stems absent (with leaves in basal rosette). Leaves 8–100 per plant, oblanceolate, 22–52 mm long including petiole, 6.5–8 mm wide, glabrous, apex acute or mucronate, base cuneate, margins entire. Petioles 5–10 mm long. Scapes 1–8 per plant, 0.5–0.8 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 10–20 cm long including scape, determinate, monochasially cymose; branches glandular-hairy. Bracts ovate, 1–2 mm long, glandular-hairy, obtuse or acute. Bracteoles absent. Pedicels 1.5–6 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate or elliptical, all free, 1.2–1.6 mm long, 0.5–0.6 mm wide, glandular-hairy, obtuse. Corolla pink, glandular-hairy on tube and petals; tube 1.4–2.5 mm long, with sinus on anterior side only. Paracorolla discontinuous, lobed, thin, glabrous, 0.5–1.1 mm high. Paracorolla lobes or appendages 6–8, all similar, acute, 2–4 opposite the anterior petals, 4 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, orbicular, 0.5–0.7 mm long, thick, glandular-hairy, obtuse. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 2.4–3.3 mm long, 1.8–2.1 mm wide, entire, obtuse. Posterior petals 2.7–4.1 mm long, 1.8–2.4 mm wide, entire, obtuse. Column 4–7.5 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent or extending beyond anthers. Capsule ellipsoidal, without raised ribs, 1.8–2.8 mm long excluding sepals, 1.4–1.7 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, c. 0.2 mm long, brown, lacunose.

***Selected specimens*: Western Australia**. Kununurra-Timber Creek road, 1.5 km W of Lake Argyle turnoff, Jul 1974, *Carr* 3078 & *Beauglehole* 46837 (DNA); 72 miles [115 km] NNW of Gibb River station, Sep 1954, *Speck* 4952 (DNA). **Northern Territory.** Shoal Bay, Sep 1980, *Andrew* 202 (CANB, DNA); 9 miles [14 km] N of Mudginberry HS, Jul 1972, *Byrnes* 2742 (DNA); 4 km W of Blythe River crossing, Jul 1987, *Clark* 1270 & *Wilson* (DNA); Kapalga, May 1977, *Collins* BC446 (DNA); Jim Jim Creek, Mar 1982, *Dunlop* 6206 & *Taylor* (DNA); Keep River N.P., Jarrnarm area, Jun 1995, *Egan* 5034 (DNA); Keep River N.P., Flying Fox Creek, Jun 1995, *Egan* 5073 (DNA); c. 250 m S of homestead, Swim Creek station, Jun 1991, *Jobson* 1362 (MEL); Wessel Islands, Oct 1972, *Latz* 3371 (BRI, DNA, MEL); Umbakumba, Groote Eylandt, Aug 1973, *Levitt* 344 (DNA); Conservation Commission carpark, Palmerston, May 1989, *Madrill* 2 (DNA); Thoraks Reserve, 12 miles [19 km] E of Darwin, Jun 1964, *Nelson* 1095 (DNA); 8 miles [13 km] N of Cooper Ck, Oct 1962, *Paine* s.n. (DNA); McMillans Road area, Darwin, Sep 1977, *Parker* 1092 (CANB, DNA, NSW, PERTH); 1.6 km E of Oenpelli Mission, Jun 1972, *Symon* 7970 (DNA); Cadell River crossing on Maningrida road, Oct 1981, *Thomson* 146 (DNA); Spirit Hills Station, Aug 1987, *Wilson* 736 (DNA). **Queensland.** Nicholson River area, Jun 1974, *Henshall* 251 (DNA).

***Reconstituted or spirit material examined*:** *Dunlop* 6206 & *Taylor* (2 fls); *Egan* 5034 (1 fl); *Egan* 5073 (2 fls).

***Distribution and habitat*:** *S. multiscapum* is distributed from the eastern Kimberley, through the northern parts of Northern Territory, to extreme north-western Queensland (Map 6). It grows in damp sand in *Eucalyptus* dominated woodlands, often near creeks or adjacent to swamps.

***Phenology*:** Flowers and capsules have been recorded from May to October, and there is one record from March.

***Affinities*:** *S. multiscapum* is closely related to *S. leptorrhizum*. See notes under that species.

17. Stylidium floribundum R.Br., Prodr. 569 (1810); *Candollea floribunda* (R.Br.) F.Muell., Syst. Census Austral. Pl. 86 (1883). **Type:** [Northern Territory]. North Island, Sir Edward Pellew Group, [15°3-'S 136°5-'E], 20 December 1802, *R. Brown* (holo: BM (2 sheets); iso: MEL [MEL1061579]).

Herbaceous annual, 7–18 cm high. Glandular hairs 0.2–0.3 mm long; glands ellipsoidal. Stems absent (with leaves in basal rosette). Leaves 6–30 per plant, oblanceolate or obovate, 8–35(–48) mm long including petiole, 4–11 mm wide, glabrous, apex acute or acuminate or mucronate, base cuneate, margins entire. Petioles 2–22 mm long. Scapes 1–20 per plant, 0.3–0.5 mm in diameter, with simple hairs. Sterile bracts absent or present. Inflorescences 7–18 cm long including scape, determinate, monochasially cymose; branches glandular-hairy or with glandular and simple hairs. Bracts deltate or lanceolate or ovate, 1–4 mm long, glandular-hairy or with simple hairs, acute. Bracteoles absent. Pedicels 1.5–5.5 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate, all free, 1.2–1.6 mm long, 0.4–0.5 mm wide, glandular-hairy, obtuse or acute. Corolla pink or yellow, glandular-hairy on tube and petals; tube 1–1.4 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, lanceolate and with slender tail, 0.4–0.6 mm long, thick, glabrous or glandular-hairy; terminal appendage present, 0.3–0.5 mm long, acute or acuminate. Labellum basal appendages less or more than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 2.1–2.9 mm long, 0.9–1.5 mm wide, entire, acute or obtuse. Posterior petals 3–3.7 mm long, 1.3–1.8 mm wide, entire, acute or obtuse. Column 4.5–5.5 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent or extending beyond anthers. Capsule obconical or ellipsoidal, without raised ribs, 3.5–5.5 mm long excluding sepals, 1.1–1.7 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, c. 0.25 mm long, brown, smooth or colliculate.

***Specimens examined*:** **Western Australia.** Mount Brophy Springs, Gardner Range, 190 km SE of Halls Creek, Jul 1995, *Coate* 367 (BRI, DNA, PERTH); 48 miles [77 km] N of Turkey Creek Police Station, Jul 1949, *Perry* 2516 (BRI, DNA). **Northern Territory**. near Hayes Creek, Jul 1946, *Blake* 16408 (BRI); 32 miles [51 km] SW of Hookers Creek, Jul 1956, *Chippendale* 2238 (BRI, DNA); McArthur River area, Jun 1976, *Craven* 4023 (BRI, CANB, DNA); Nicholson River area, Jun 1974, *Henshall* 367 (DNA); Newcastle Waters Station, May 1975, *Henshall* 998 (DNA); Powell Creek, Central Australia, 1894, *Holtze* (MEL); 47 km S of Elliot, Stuart Highway, Jun 1974, *Latz* 5498 (DNA); MacAdam Range, 1855, *Mueller* (MEL); sources of the Wentworth River, Gulf of Carpentaria, undated, *Mueller* (MEL); South Bay, Bickerton Island, Gulf of Carpentaria, Jun 1948, *Specht* 485 (AD, BRI, MEL); Lake Eames area, 2 km NE of lake, Vanderlin Island, Jul 1988, *Thomson* 2515, 2524 (DNA, NT). **Queensland**. BURKE DISTRICT: Mica Creek, 10 km S of Mt Isa, Sep 1983, *Schmid* 739 (BRI).

***Reconstituted or spirit material examined*:** *Craven* 4023 (2 fls); *Schmid* 739 (2 fls); *Thomson* 2515 (2 fls).

***Distribution and habitat*:** *S. floribundum* is distributed across northern Australia from the Kimberley to north-western Queensland (Map 8). It inhabits swampy flats or creek-beds, dominated by *Melaleuca* spp. or less commonly, *Eucalyptus* spp., always in sandy soils.

***Phenology*:** Flowers and capsules have been recorded from May to September.

***Affinities*:** *S. floribundum* is closely related to *S. inaequipetalum* but differs by the scapes 0.3–0.5 mm diameter (0.6–4.5 mm for *S. inaequipetalum*), corolla glandular-hairy on tube and petals (glandular-hairy on petals only for *S. inaequipetalum*), labellum lanceolate, acute (ovate, obtuse for *S. inaequipetalum*) and the mostly yellow flowers (pink for *S. inaequipetalum*).

***Conservation status*:** There are few collections in Australian Herbaria of this species and it is probably uncommon. However, its distribution is wide, so it is not thought to be of conservation concern at present.

18. Stylidium inaequipetalum J.M.Black, Trans. & Proc. Roy. Soc. South Australia 62: 106 (1938). **Type:** Northern Territory. near Ayers Rock, 25°21' S 131°02' E, 13 June 1937, *J.B. Cleland* (holo: AD).

Herbaceous perennial, 7–40 cm high. Glandular hairs 0.2–0.4 mm long; glands ellipsoidal. Stems absent (with leaves in basal rosette). Leaves 20–100 per plant, oblanceolate, 15–81 mm long including petiole, 2–8 mm wide, glabrous, apex obtuse or acute, base cuneate, margins entire. Petioles 12–45 mm long. Scapes 1–11 per plant, 0.6–4.5 mm in diameter, with simple hairs. Sterile bracts absent or present. Inflorescences 7–40 cm long including scape, indeterminate, branches monochasially cymose; branches glandular-hairy. Bracts lanceolate or ovate, 1.5–9.5 mm long, glandular-hairy, acute. Bracteoles absent. Pedicels 1.5–7 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or ovate, all free, 1.2–1.4 mm long, 0.5–0.7 mm wide, glandular-hairy, obtuse. Corolla pink, glandular-hairy on petals only; tube 1.1–1.5 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, ovate, 0.5–0.7 mm long, thick, glabrous; obtuse. Labellum basal appendages less or more than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 1–2.4 mm long, 0.5–0.9 mm wide, entire, obtuse. Posterior petals 2.9–5.9 mm long, 1.7–3 mm wide, entire, obtuse. Column 4–7.5 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 3.5–5.3 mm long excluding sepals, 1.3–1.8 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, 0.25–0.3 mm long, brown, smooth.

***Selected specimens*:** **Northern Territory.** Valley of the Winds, Mt Olga, May 1985, *Bates* 5615 (AD); Kathleen Springs area, George Gill Range, Jul 1968, *Beauglehole* 26910 (DNA); Mt Connor, c. 220 km SW of Alice Springs, Jun 1974, *Carr* 1849 & *Beauglehole* 45628 (DNA); Ayers Rock, Jun 1935, *Cleland* s.n. (AD); MacDonnells Range [near Haast Bluff], 1872, *Giles* (MEL); Mt Currie, Sep 1974, *Henshall* 765 (DNA); Napperby Station, May 1975, *Henshall* 1020 (AD, DNA); Hull River, Aug 1973, *Latz* 4171 (AD, BRI, DNA, NSW, MEL); Alice Springs golfcourse, Jun 1974, *Latz* 5129 (DNA, NSW); Curtain Springs station, Sep 1974, *Latz* 5689 (AD, DNA); Stokes Creek, George Gill Ranges, Aug 1981, *Latz* 8756 (DNA); Maggi Springs, Ayers Rock, Jan 1969, *Maconochie* 649 (AD, BRI, DNA); c. 14 miles [22 km] W of Lasseters Cave, Petermann Ranges, Jan 1969, *Maconochie* 686 (DNA, K); Hull River, c. 12 km west of Docker River, Aug 1973, *Munir* 5181 (AD, DNA); Hull River near Lasserters Cave, Sep 1997, *Murfet* 2784 (AD, DNA); summit of Ayers Rock, c. 350 km SW of Alice Springs, Aug 1957, *Schodde* 397 (AD, K); Macdonnell Ranges, Jul 1894, *Tate* (AD, DNA); Kings Canyon, George Gill Range, Jul 1966, *Willis* (AD, MEL, NSW).

***Reconstituted or spirit material examined*:** *Beauglehole* 26910 (2 fls); *Murfet* 2784 (3 fls).

***Distribution and habitat*:** *S. inaequipetalum* is confined to the south-western parts of Northern Territory (Map 4). It grows on sheltered creekbanks in sand or amongst rocks, in or near the various ranges and mountains of the area.

***Phenology*:** Flowers and capsules have been recorded from almost every month of the year.

***Affinities*:** *S. inaequipetalum* is closest to *S. floribundum* (see notes under that species). It is also allied to the *S. debile* group. It differs from *S. paniculatum* by the scapes with simple hairs (glabrous for *S. paniculatum*), glandular-hairy inflorescence branches and bracts (glabrous for *S. paniculatum*), corolla glandular hairy on petals only (on tube only for *S. paniculatum*) and the glabrous labellum (glandular-hairy for *S. paniculatum*).

19. Stylidium paniculatum (Maiden & Betche) A.R.Bean **comb. et stat. nov.**

S. debile var. *paniculatum* Maiden & Betche, Proc. Linn. Soc. New South Wales 30: 367 (1905). **Type:** New South Wales. Boonoo Boonoo near Tenterfield, [28°4-'S 152°0-'E], February 1905, *J.L. Boorman* (holo: NSW; iso: BRI, MEL).

Herbaceous annual, 10–35 cm high. Glandular hairs 0.1–0.2 mm long; glands ellipsoidal. Stems present or absent (with leaves in basal rosette), glabrous. Leaves 6–30 per plant, scattered along stems, oblanceolate or obovate, 10–31 mm long including petiole, 3–9 mm wide, glabrous, apex obtuse or acute, base cuneate, margins entire. Petioles 3–10 mm long. Scapes 1 per plant, 0.4–0.9 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 10–25 cm long including scape, indeterminate, branches monochasially cymose; branches glabrous. Bracts deltate or lanceolate or ovate, 1–3.5 mm long, glabrous, obtuse or acute. Bracteoles absent. Pedicels 2–3 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate or elliptical, all free, 1–1.5 mm long, 0.4–0.6 mm wide, glandular-hairy, obtuse or acute. Corolla pink, glandular-hairy on tube only; tube 1.1–1.5 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, ovate or orbicular, 0.5–0.7 mm long, thick, glandular-hairy, obtuse. Labellum basal appendages less or more than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 2–3.1 mm long, 1.2–2.4 mm wide, entire, obtuse. Posterior petals 2.9–4 mm long, 1.5–2.8 mm wide, entire, obtuse. Column 4.5–5.5 mm long, of uniform width throughout, glabrous or glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 3.6–5.8 mm long excluding sepals, 1.1–1.7 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, c. 0.4 mm long, brown or black, colliculate. Fig. 2 A-B.

***Specimens examined*:** **Queensland**. DARLING DOWNS DISTRICT: Stanthorpe, Feb 1891, *Bailey* s.n. (BRI); Watson's Swamp, 6 km N of Amiens, Mar 1993, *Bean* 5852 & *Forster* (BRI, MEL); Sorrento Lane, west of

Dalveen, Apr 1998, *Bean* 13200 (BRI); Dunn's road, W of The Summit, Apr 1998, *Bean* 13206 (BRI); Wallangarra, Jan 1906, *Boorman* (NSW); Applethorpe, Swimming Hole, Nov 1946, *Everist & Webb* 1302 (BRI); Mt Norman firebreak track, Girraween N.P., Apr 1993, *Forster* PIF13275 (BRI); Sorrento Lane, along rabbit fence W of Dalveen, Feb 1994, *Grimshaw* PG470 (BRI); 9 km NW of Ballandean, Murphys Creek, Dec 1994, *Halford* Q2364 (BRI); Stanthorpe, Mar 1963, *Jones* s.n. (BRI); Fletcher, Jan 1977, *McDonald* 1759 (BRI). **New South Wales**. NORTHERN TABLELANDS: Severn S.F., Severn River Falls, Nov 1996, *Forster* PIF20115 (BRI, NSW); turnoff Brushabbers Road, Tenterfield to Jennings, Mar 1956, *Gray* 3726 (NSW); Maryland, undated, *Hickey* 2021 (BRI); Tompkins Gully, Maryland road, Jan 1992, *Wilson* 1303 & *Rowe* (NSW). NORTH COAST: Tooloom Falls, 5 miles [8 km] S of Urbenville, Dec 1965, *Constable* 6628 (NSW).

Reconstituted or spirit material examined: *Bean* 13200 (2 fls); *Forster* 13275 (2 fls); *Grimshaw* PG470 (3 fls); *McDonald* 1759 (2 fls).

Distribution and habitat: *S. paniculatum* apparently has a very restricted distribution, mainly between Dalveen (Queensland) and Tenterfield (New South Wales) on granite substrate at altitudes of between 800-1000 metres. In addition, collections from Severn River (further west) and from Tooloom Falls (further east) have been made (Map 7). It grows along creeks, drains or low-lying flats where the soil is sandy and moist for much of the year.

Phenology: Flowers and capsules have been recorded from November to April.

Affinities: *S. paniculatum* differs from *S. debile* by the paniculate inflorescence and the absence of bracteoles.

Conservation status: Data Deficient (DD) category according to the International Union for Conservation of Nature and Natural Resources (Anon. 1994).

20. Stylidium debile F.Muell., Fragm. 1: 149 (1859); *Candollea debilis* (F.Muell.) F.Muell., Syst. Census Austral. Pl. 86 (1883). **Type:** Queensland. MORETON DISTRICT: Brisbane River, [27°—'S 152° —'E], in 1856, *F. Mueller* (holo: MEL).

Herbaceous annual, 15–30 cm high. Glandular hairs 0.1–0.15 mm long; glands ellipsoidal. Stems present or absent (with leaves in basal rosette), glabrous. Leaves 20–200 per plant, scattered along stems, oblanceolate or obovate, 8–30 mm long including petiole, 3–7 mm wide, glabrous, apex obtuse or acute or mucronate, base cuneate, margins entire. Petioles 1.5–9 mm long. Scapes 1–2 per plant, 0.4–0.8 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 10–25 cm long including scape, indeterminate, racemose. Bracts linear or lanceolate, 1.5–4.5 mm long, glabrous, obtuse or acute. Bracteoles present, 1.5 mm long. Pedicels 2.5–4 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate, all free, 1–1.3 mm long, 0.5–0.7 mm wide, glandular-hairy, obtuse or acute. Corolla pink, glandular-hairy on tube and petals; tube 1.1–1.4 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, ovate or orbicular, 0.7–0.8 mm long, thick, glandular-hairy, obtuse. Labellum basal appendages less or more than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 1.9–2.8 mm long, 1.2–2 mm wide, entire, obtuse. Posterior petals 2.7–3.3 mm long, 2–2.2 mm wide, entire, obtuse. Column 4.5–5.5 mm long, of uniform width throughout, glabrous or glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 3.5–5 mm long excluding sepals, 1.2–1.8 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.4–0.5 mm long, brown, colliculate.

Selected specimens: **Queensland.** COOK DISTRICT: Yungaburra, Sep 1934, *Coleman* s.n. (QRS); Bellenden-Ker Range, 1860-96, *Karsten* (MEL). LEICHHARDT DISTRICT: Mt Playfair, Nogoa River, 1890, *Biddulph* (MEL); Two Mile Creek, Blackdown Tableland, 12 miles [19 km] SSE of Bluff, Sep 1959, *Johnson* 983 (BRI); Blackdown Tableland, Mimosa Creek at road crossing, Jan 1983, *Telford* 9158 & *Butler* (CANB, MEL). PORT CURTIS DISTRICT: Rosedale, Sep 1930, *Dovey* X14 (BRI); Deepwater Creek N.P., c. 4 km N of campsite, Sep 1992, *Sharpe* 5334 (BRI, MEL). BURNETT DISTRICT: Eidsvold, undated, *Bancroft* (BRI); E116 Narayen, Nov 1973, *Tothill* N1308 (BRI). WIDE BAY DISTRICT: Prices Pool, 4 km S of Toolara Forest Station, near Gympie, Sep 1993, *Bean* 6471 (BRI, CANB); Yalanga station, Bates road, NE of Kin Kin, Dec 1994, *Bean* 8150 & *Grimshaw* (BRI); Epsilon L.A., S.F. 840, south-west of Bundaberg, Oct 1996, *Bean* 10999 (BRI, MEL); head of Stony Creek, 11 km N of Coalstoun Lakes, Apr 1983, *Forster* PIF1564 (BRI); S.F. 1294, Harwood Creek, c. 29.5 km SE of Childers, Feb 1996, *Sparshott* KMS741 & *Price* (BRI). MARANOA DISTRICT: Clayhole Creek, 20 miles [32 km] S of Yuleba, Nov 1958, *Johnson* 673 (BRI). DARLING DOWNS DISTRICT: North Dulacca, Oct 1963, *Hockings* s.n. (BRI). MORETON DISTRICT: White Rock, 3 km S of Redbank Plains, Ipswich, Jun 1990, *Bird* s.n. (BRI); near Sandgate, Brisbane, Nov 1960, *Blake* 21427 (BRI); 3 miles [5 km] NW of Greenbank, Mar 1960, *Pedley* 562 (BRI); Castle Hill range, c. 6 km W of Coolum Beach, Nov 1982, *Sharpe* 3269 & *Windolf* (BRI, NSW). **New South Wales.** NORTH COAST: Woodburn, Dec 1894, *Baeuerlen* (NSW); Evans Head, Nov 1972, *Coveny* 4660 (BRI, NSW); Wells Crossing, 1.6 km N of Halfway Creek, 29 km SSE of Grafton, Dec 1971, *Thurtell & Coveny* 3839 (BRI, NSW); Clarence River, undated, *Wilcox* (MEL). CENTRAL COAST: Alexandria Swamps, March 1888, *Fletcher* (NSW); Gosford State Nursery, Mar 1917, *Hamilton* (NSW); Botany Bay, undated, *Leichhardt* (MEL).

Reconstituted or spirit material examined: *Bean* 10999 (2 fls); *Bird* s.n. (2 fls); *Sharpe* 3269 & *Windolf* (2 fls).

Distribution and habitat: Recent herbarium collections (post-1960) indicate a distribution for *S. debile* from Blackdown Tableland and Deepwater National Park in Queensland to the Coffs Harbour region in New South Wales. Historical collections indicate additional occurrences on the Atherton Tableland and at Mt Playfair near Tambo, and as far south as Alexandria Swamps (33° 54'S) in Sydney (Map 8). It grows on creekbanks or in swampy areas often dominated by *Lophostemon suaveolens* or *Melaleuca quinquenervia*. Soils vary from sand to pale silty clay.

Phenology: Flowers and capsules have been recorded from every month of the year

Notes: Erickson (1958) and Stanberg (1992) described the seeds of *S. debile* as 'hairy'. However this is clearly not the case, and the seeds of *S. debile* are glabrous, as in all other *Stylidium* species.

S. debile is probably extinct on the Atherton Tableland, an area which has been extensively modified. It is probably also extinct in the greater Sydney area as there have been no herbarium records from this century, and it was not recorded by Benson and Howell (1994).

Conservation status: A widespread species which is not considered to be at risk.

21. Stylidium velleioides A.R.Bean **sp. nov.** *S. debili* affinis, sed differens inflorescentiis paniculatis, bracteolis deficientibus, columna longiore et petalis posterioribus longioribus. **Typus:** Queensland. NORTH KENNEDY DISTRICT: White Dam, "Princess Hills", west of Ingham, 18°19'S 145°22'E, 1 August 1998, *A.R.Bean* 13764 & *I. Fox* (holo: BRI; iso: DNA, K, MEL, NSW, QRS, distribuendi).

Herbaceous annual, 15–30 cm high. Glandular hairs 0.1–0.2 mm long; glands ellipsoidal. Stems present or absent (with leaves in basal rosette), glabrous. Leaves 6–30 per plant, scattered along stems, obovate, 8–33 mm long including petiole, 3.5–9 mm wide, glabrous, apex obtuse or acute, base cuneate, margins entire. Petioles 2–8 mm long. Scapes 1–3 per plant, 0.4–0.7 mm in diameter, glabrous. Sterile bracts absent. Inflorescences 15–25 cm long including scape, indeterminate, branches monochasially cymose; branches glabrous. Bracts lanceolate, 1–2.5 mm long, glabrous, obtuse. Bracteoles absent. Pedicels 2–6.5 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals deltate or lanceolate, all free, 1–1.3 mm long, 0.4–0.6 mm wide, glandular-hairy, acute. Corolla pink, glandular-hairy on tube and petals or glandular-hairy on petals only; tube 1.3–1.5 mm long, with sinus on anterior side only. Paracorolla absent. Labellum attached at base of anterior sinus of corolla tube, ovate or orbicular, 0.5–0.7 mm long, thick, glandular-hairy, obtuse. Labellum basal appendages more than half length of labellum, glabrous. Petals all free, A1+A2+P1+P2. Anterior petals 2.5–3 mm long, 1.4–2.2 mm wide, entire, obtuse. Posterior petals 3.3–4.4 mm long, 1.8–3 mm wide, entire, obtuse. Column 5.5–6.5 mm long, of uniform width throughout, glabrous or glandular-hairy; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule ellipsoidal, without raised ribs, 3.6–6.8 mm long excluding sepals, 1.2–1.5 mm wide; halves detaching distally, not recurved. Seeds globose or ellipsoidal, 0.4–0.5 mm long, brown, colliculate. Fig. 2 C-E.

Specimens examined: Queensland. BURKE DISTRICT: headwaters of Flinders River, 8.5 km E of "Reedy Springs" sign, Aug 1997, *Bean* 12267 (BRI). COOK

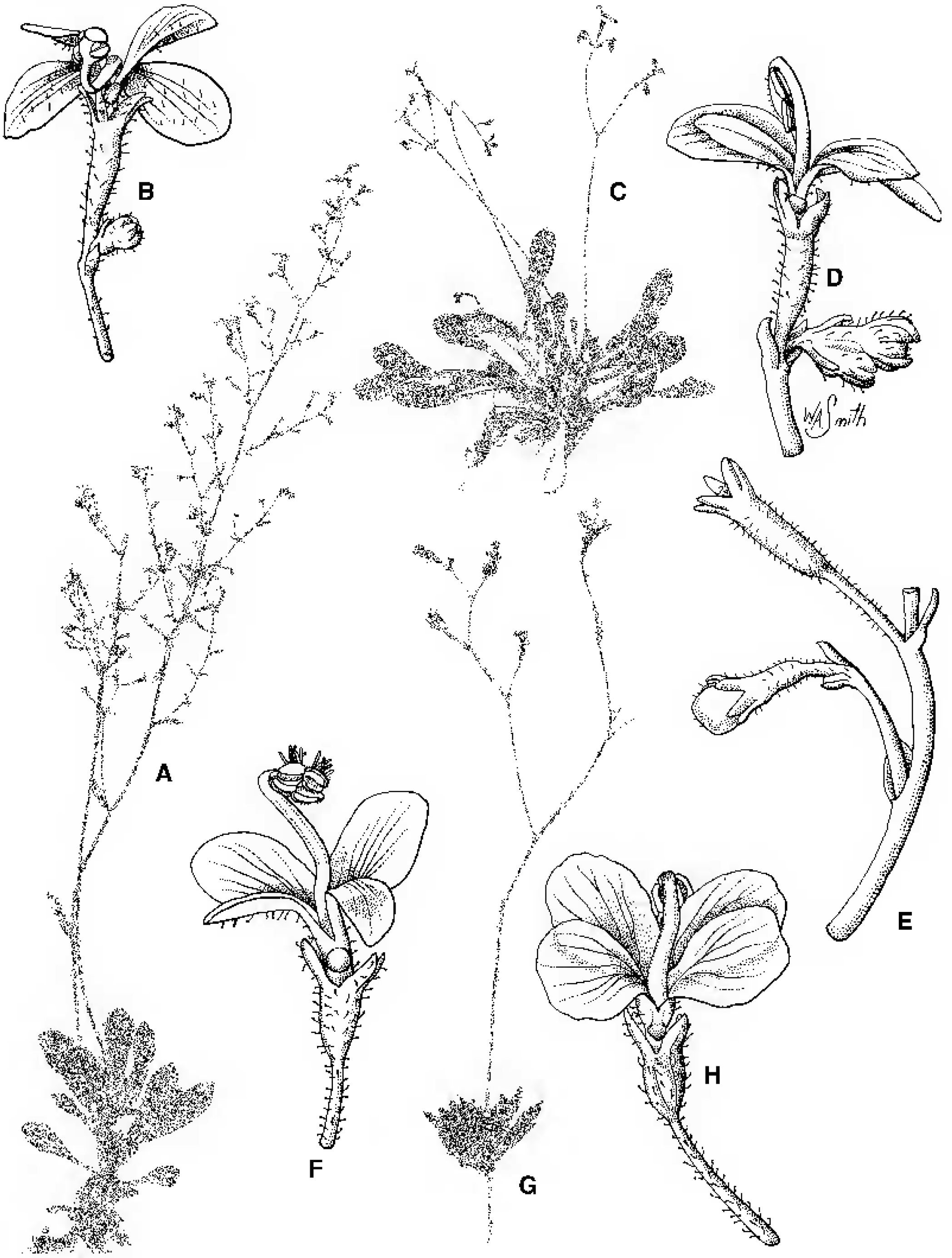

Fig. 2. ***Stylidium paniculatum*** A. whole plant x 0.5. B. lateral view of flower x 5. ***Stylidium velleioides*** C. whole plant x 0.5. D. lateral view of flower, and emerging buds x 5. E. bud and immature capsule x 5. ***Stylidium austrocapense*** F. whole plant x 1. G. lateral view of flower x 5. A from *Forster* 20115; B from *Bean* 13206; C-E from *Bean* 12267; F from *Clarkson* 9960 & *Neldner*; G from *Clarkson* 8119 & *Neldner*.

District: Mt Surprise, undated, *Armit* 848 (MEL); Red Camp Swamp, Yaramulla station, Jul 1981, *Williams* 81122 (BRI). North Kennedy District: 31.6 km from Hann Highway, towards “Clarke Hills”, Aug 1997, *Bean* 12264 (BRI); Mt Fox, Sep 1949, *Clemens* s.n. (BRI); Port Denison, 1874, *Fitzalan* (MEL); Cleveland Bay, 1876, *Johnson* (MEL); Kelsey Creek, Proserpine district, undated, *Michael* 1488 (BRI); c. 45 miles [72 km] SE of Mt Garnet, Nov 1967, *Morain* 234 (BRI); Flinders Highway 43 km SW of Charters Towers, Jul 1974, *Ollerenshaw* 1093 & *Kratzing* (BRI, CANB); Charters Towers, Aug 1891, *Plant* s.n. (BRI). South Kennedy District: Clarke Range W of Cathu, Apr 1978, Byrnes 3814 & Clarkson (BRI); Slade Point dunal system, E of Finch Street, Mar 1993, *Champion* 806 (BRI); Dalrymple Heights, Jul-Nov 1947, *Clemens* s.n. (BRI); Laglan, c. 80 miles [129 km] W of Clermont, Oct 1960, *Everist* s.n. (BRI). Port Curtis District: 16.6 km by road W of ‘Waverley’ towards ‘Croydon’ off the St Lawrence-Marlborough road, Sep 1975, *Coveny* 6917 & *Hind* (NSW); Broadsound, St Lawrence, Oct 1873, *Gulliver* (MEL).

***Reconstituted or spirit material examined*:** *Bean* 12264 (2 fls); *Bean* 12267 (2 fls); *Bean* 13764 & *Fox* (2 fls); *Morain* 234 (2 fls).

***Distribution and habitat*:** *S. velleioides* is confined to tropical Queensland, from Mt Surprise to St Lawrence (southernmost record 22° 21’S) (Map 6). It grows along creekbanks and seepage areas, mostly in eucalypt woodland but with one collection from a *Melaleuca leucadendra* forest.

***Phenology*:** Flowers and capsules have been recorded from March to November

***Affinities*:** *S. velleioides* differs from *S. debile* by the paniculate inflorescences, the absence of bracteoles, the longer column and the longer posterior petals. *S. velleioides* differs from *S. paniculatum* by the longer column and the mostly longer capsules. *S. velleioides* has been confused with *S. semipartitum* in the past, but differs from that by its glabrous leaves and scapes.

***Conservation status*:** A widespread species which is not considered to be at risk.

***Etymology*:** The specific epithet refers to the strong resemblence of sterile material to that of *Velleia spathulata*.

22. Stylidium ornatum S.T.Blake, Proc. Roy. Soc. Queensland 73: 76 (1963). **Type:** Queensland. Moreton District: Beerwah, 26°5-’S 152°5-’E, 18 November 1959, *S.T. Blake* 21160 (holo: BRI).

Herbaceous annual or perennial, 10–30 cm high. Glandular hairs 0.1–0.15 mm long; glands capitate. Stems present or absent (with leaves in basal rosette), glabrous. Leaves 5–25 per plant, mostly in terminal rosette, with some scattered below, oblanceolate, 13–37 mm long including petiole, 3–10 mm wide, glabrous, apex obtuse or acute, base cuneate, margins entire. Petioles 3–8 mm long. Scapes 1–2(–4) per plant, 0.7–2 mm in diameter, glabrous. Sterile bracts present. Inflorescences 12–30 cm long including scape, indeterminate, branches monochasially cymose; branches glandular-hairy. Bracts lanceolate or ovate, 1.5–4.5 mm long, glabrous, obtuse or acute. Bracteoles absent. Pedicels 3–6 mm long, glandular-hairy. Hypanthium obovoid to ellipsoidal, glandular-hairy throughout. Sepals lanceolate, all free, 1.1–1.7 mm long, 0.4–0.7 mm wide, glabrous, obtuse or acute. Corolla pink, glabrous; tube 1.1–1.4 mm long, with sinus on anterior and posterior sides. Paracorolla discontinuous, lobed, thin, glabrous, 0.5–0.7 mm high. Paracorolla lobes or appendages 4, all similar, acute, 2 opposite the anterior petals, 2 opposite the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, lanceolate, 0.8–1.5 mm long, thick or thin, glabrous; terminal appendage present, 0.8–1.5 mm long, acute. Labellum basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 4.1–4.5 mm long, 2.3–2.6 mm wide, entire, acute or obtuse. Posterior petals 3.7–4.2 mm long, 1.5–2.1 mm wide, entire, acute or obtuse. Column 5–6 mm long, of uniform width throughout, glabrous; lateral lobes absent; spur absent. Stigma sessile. Corona absent. Capsule obconical, without raised ribs, 3.3–4 mm long excluding sepals, 1.8–2.4 mm wide; halves detaching distally, not recurved. Seeds ellipsoidal, 0.4–0.5 mm long, brown, lacunose.

***Specimens examined*:** **Queensland.** Wide Bay District: Tin Can Bay, Sep 1946, *Clemens* s.n. (BRI); Fraser Island, Dec 1919, *Epps* 2 (BRI); Cooloola, near Teewah Creek, Sep 1974, *Harrold* C404 (BRI); Fraser Island, Jan 1894, *Lovell* s.n.(BRI); western shore of Lake Boemingen, Fraser Island, Aug 1984, *Walsh* 1401 (BRI, MEL); between Howard and Traverston, Oct 1929, *White* 6375 (BRI). Moreton District: Pine

Ridge Reserve c. 4 miles [6 km] N of Southport, Jan 1968, *Baxter* 1155 (BRI); western edge of Mooloolah River N.P., S of Buderim, May 1997, *Bean* 12015 (BRI); Beerwah, Nov 1960, *Blake* 21434 (BRI, MO, NSW); between Myora and Point Lookout, North Stradbroke Island, Aug 1969, *Coveny* 2029 (BRI, NSW); Moreton Island, 1.4 km ENE of Bulwer, Mar 1973, *Durrington* 330 (BRI); Russell Island, Moreton Bay, undated, *Hauser* s.n. (BRI); 100 metres W of Cinnamon Ave, Coolum Beach, Feb 1982, *Sharpe* 3158 (BRI); 3 km S of Buderim, Apr 1986, *Sharpe* 4327 & *Bean* (BRI); Stradbroke Island, Sep 1915, *White* s.n. (BRI); Maroochydore, Apr 1916, *White* s.n. (BRI). **New South Wales**. North Coast: Wardell, Nov 1893, *Baeuerlen* 1087 (NSW); N of Lake Arragan, Angourie, Feb 1969, *Blaxell* 122 (NSW); c. 1.5 miles [2.4 km] from the coast, just N of Crowdy Head, near Harrington, Jun 1966, *Boyd & McGillivray* 1796 (NSW); Bonny Hills, 16 miles [26 km] S of Port Macquarie, Mar 1970, *Clark* s.n. (NSW); Bombah Pt., Lake Myall, Jan 1952, *Constable* 19058 (NSW); Evans Head, Nov 1972, *Coveny* 4659 (BRI, NSW); South West rocks near oil storage tanks, Apr 1986, *Coveny* 12217 & *Bishop* (BRI, MEL, NSW); Byron Bay, Aug 1915, *Rupp* s.n. (MEL); Smith's Lake, Bungwahl, Mar 1924, *Rupp* s.n. (MEL).

Reconstituted or spirit material examined: *Bean* 12015 (3 fls); *Sharpe* 3158 (1 fl); *Walsh* 1401 (2 fls).

Distribution and habitat: *S. ornatum* extends from Fraser Island in Queensland to the Myall Lakes area in New South Wales (Map 7). It is confined to "wallum" or heathland communities on infertile coastal sands which are waterlogged for much of the year.

Phenology: Flowers and capsules have been recorded from every month of the year

Affinities: *S. ornatum* differs from *S. debile* by the capitate glands (ellipsoidal for *S. debile*), cymose inflorescence (racemose for *S. debile*), the absence of bracteoles (bracteoles present for *S. debile*), the glabrous sepals and corolla (glandular-hairy for *S. debile*), paracorolla present (absent for *S. debile*) and the obconical capsule (ellipsoidal for *S. debile*).

Conservation status: A widespread species which is not considered to be at risk.

Notes: *S. ornatum* was not recognised to occur in New South Wales by Stanberg (1992), but it was by Beadle (1984).

Stylidium sect. **Lanata** A.R.Bean **sect. nov.** Herbae perennes; caulorhiza globosa, lanata; pili glandulosi praesentes; folia rosulata, obovata usque spathulata, mucrone longo piliformi; sepala omnia libera, glandulari-hirsuta; labellum glabrum, ovatum, basi sinus anterioris affixum, appendices praesentes; paracorolla absens; columna glabra; semina sphaerica, colliculata, mamilla parva. **Typus:** *S. eriorhizum* R.Br.

Rootstock globose, woolly. Leaves obovate to spathulate with long hair-like mucro, in basal rosette. Glandular hairs present, glands ellipsoidal. Inflorescence indeterminate; flowers pedicellate; corolla tube with sinus on anterior side only; petals entire and obtuse, laterally fused; labellum attached at base on anterior sinus, basal appendages present. Paracorolla absent. Column lateral lobes absent; spur absent. Anther cells 4. Stigma sessile. Capsule obovoid; seeds globose with small nipple, brown to black.

23. Stylidium eriorhizum R.Br., Prodr. 569 (1810); *Candollea eriorhiza* (R.Br.) F.Muell., Syst. Census Austral. Pl. 86 (1883). **Type:** [Queensland]. Thirsty Sound, Shoalwater Bay, [22°2-'S 150°1-'E], 3 September 1802, *R.Brown* (holo: BM).

See Bean (1999) for description and distribution map.

24. Stylidium ramosissimum A.R.Bean, Austrobaileya 5(2): 323-30 (1999). **Type:** Queensland. Cook District: Turtle Rock area, Laura sandstone escarpment, 15°39'S 144°30'E, 22 January 1993, *P.I. Forster* PIF12850 & *A.R. Bean* (holo: BRI; iso: DNA, MEL).

See Bean (1999) for description, illustration and distribution map.

25. Stylidium leiophyllum A.R.Bean, Austrobaileya 5(2): 323-30 (1999). **Type:** Queensland. Cook District: 0.9 km north of the Big Coleman River on the Peninsula Development road, 14°34'S 143°25'E, 21 December 1988, *J.R. Clarkson* 7722 & *V.J. Neldner* (holo: BRI; iso: DNA, K, MBA, PERTH, QRS).

See Bean (1999) for description, illustration and distribution map.

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References

Anon. (1994). IUCN *Red List Categories*. International Union for Conservation of Nature and Natural Resources: Switzerland.

Beadle, N.C.W. (1984). *Student's Flora of North-eastern New South Wales, Part* 5. University of New England Printery: Armidale.

Bean, A.R. (1999). Two new species of *Stylidium* Willd. (Stylidiaceae) from north Queensland. *Austrobaileya* 5(2): 323-30.

Benson, D & Howell, J. (1994). The Natural Vegetation of the Sydney 1:100 000 map sheet. *Cunninghamia* 3(4): 677-787.

Bentham, G. (1868). Stylidiaceae. In *Flora Australiensis* 4: 1-37. L. Reeve & Co.: London.

Brown, R. (1810). *Prodromus Florae Novae Hollandiae*.

Candolle, A.P. de (1839). Prodromus Systematis Naturalis regni vegetabilis 7(2). *Treuttel & Wurtz*: Paris

Carlquist, S. (1979). *Stylidium* in Arnhem Land: New Species, modes of speciation on the sandstone plateau, and comments on floral mimicry. *Aliso* 9(3): 411-61.

Dallwitz, M.J., Paine, T.A., Zurcher, E.J. (1993). DELTA *User's Guide, A General System for Processing Taxonomic Descriptions*, 4th ed. CSIRO: East Melbourne.

Erickson, R. (1958). *Triggerplants*. Paterson Brokensha Pty Ltd: Perth.

Henderson, R.J.F. (1997). (ed.) *Queensland Plants - Names and Distribution*. Department of Environment: Brisbane.

Kenneally, K.F. & Lowrie, A. (1994). *Stylidium costulatum* (Stylidiaceae), a new tropical species of triggerplant from the Kimberley, Western Australia and the lectotypification of *S. floodii. Nuytsia* 9(3): 343-349.

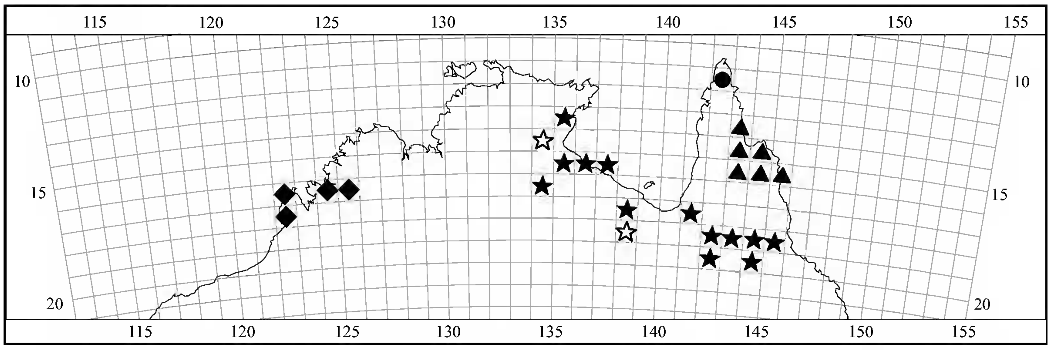
Lowrie, A. & Kenneally, K.F. (1997). Eight new species of triggerplant (*Stylidium:* Stylidiaceae) from northern Australia. *Nuytsia* 11(2): 199-217.

McKee, H.S. (1963). The Bleeser Botanical Collection from Northern Australia. *Contributions from the New South Wales National Herbarium* 3(4): 233-4.

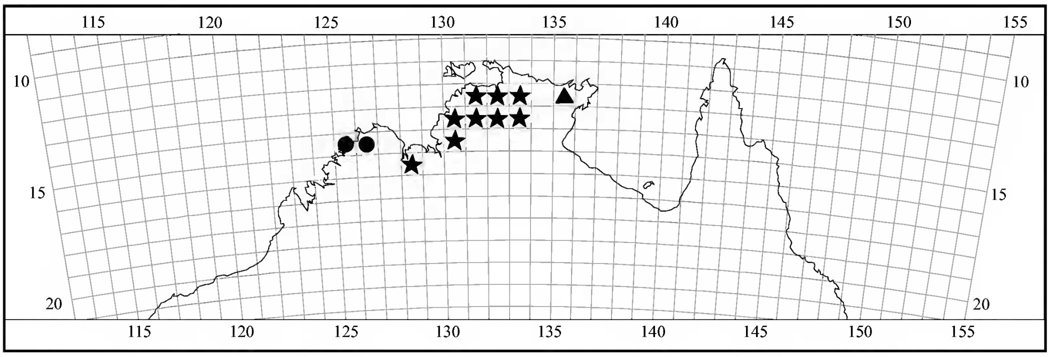
Mildbraed, G.W.J. (1908). *Stylidium* in *H.G.A. Engler (ed.), Das Pflanzenreich, Regni vegetabilis conspectus*, Heft 35. Englemann: Berlin.

Slooten, D.F. van (1954). Stylidiaceae. In Fl. Malesiana Ser. 1, 4: 529-32. *Noordhoff-Kolff N.V.*: Djakarta.

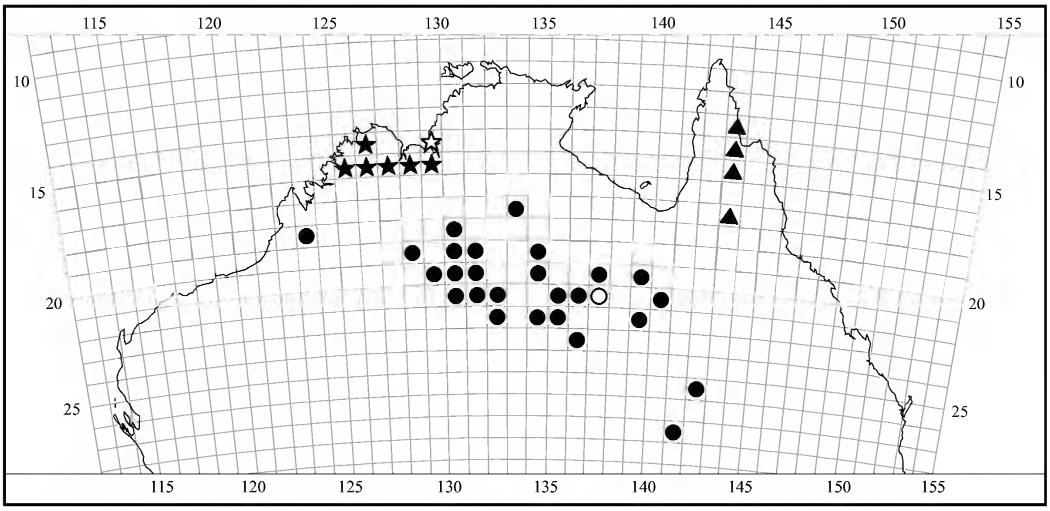
Stanberg, L. (1992). Stylidiaceae. pp. 442-5 in G. Harden (ed.), *Flora of New South Wales Vol.* 3. New South Wales University Press: Sydney.



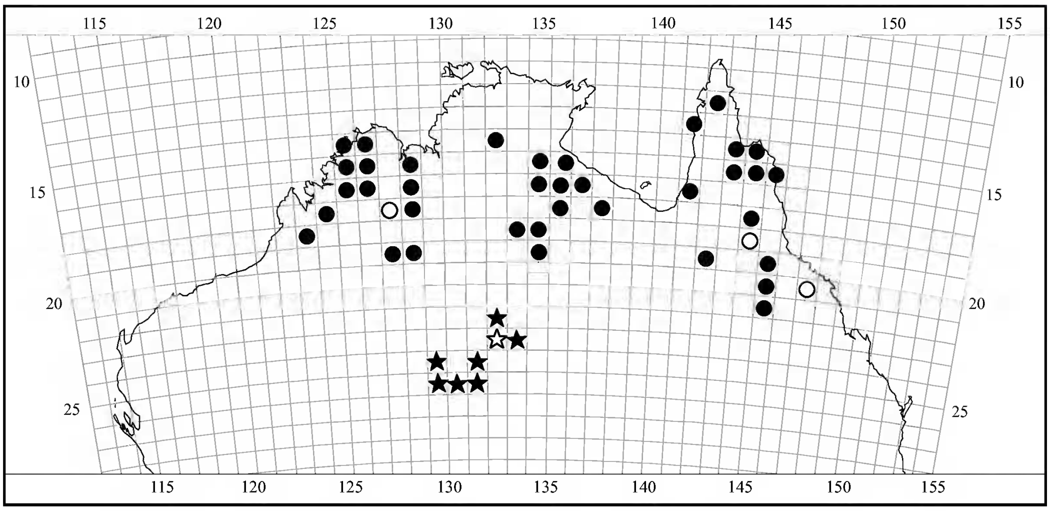
Map 1. Distribution of ● *Stylidium foveolatum*, ▲ *S.clarksonii*, ★*S. costulatum* and *S. floodii* (☆pre-1960).



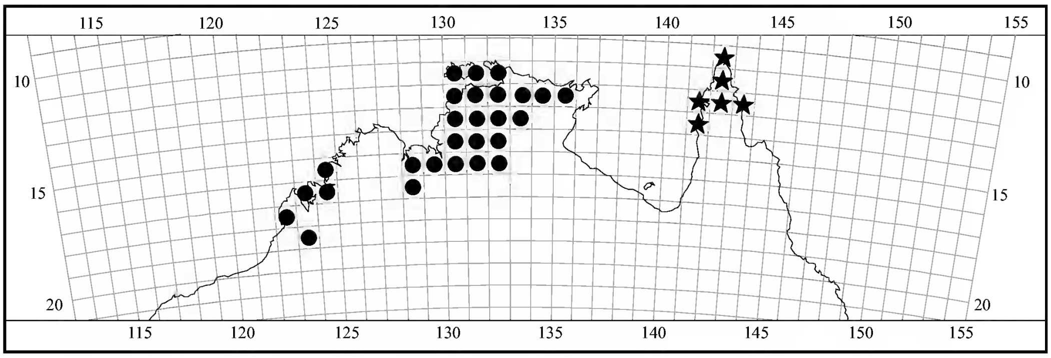
Map 2. Distribution of ★*Stylidium turbinatum*, ● *S.rivulosum* and ▲ *S. symonii.*



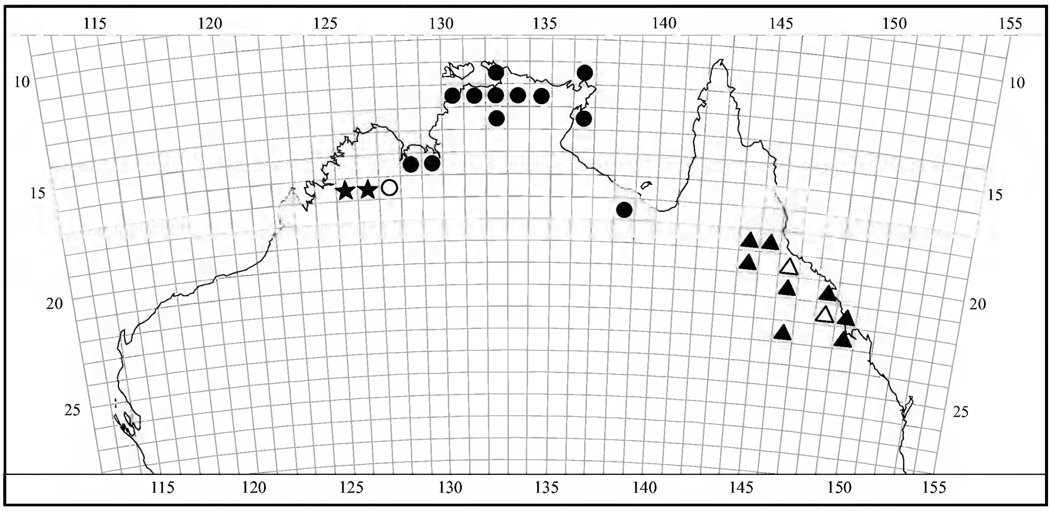
Map 3. Distribution of ● *Stylidium desertorum*, ▲ *S.austrocapense* and ★*S. leptorrhizum* (O☆pre-1960).



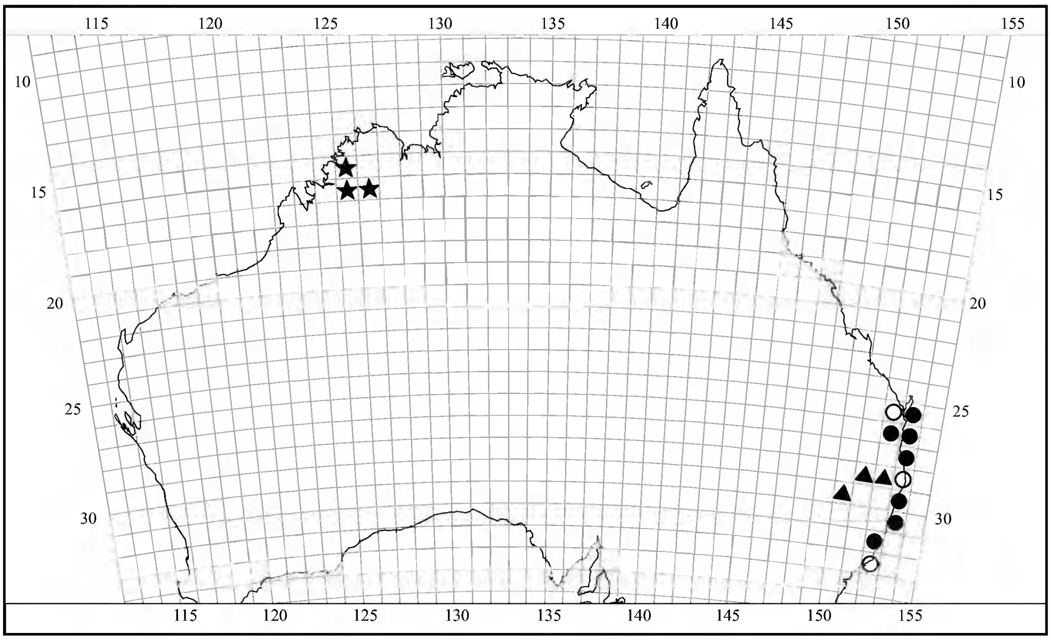
Map 4. Distribution of ● *Stylidium adenophorum*, ★*S.inaequipetalum* (○☆pre-1960).



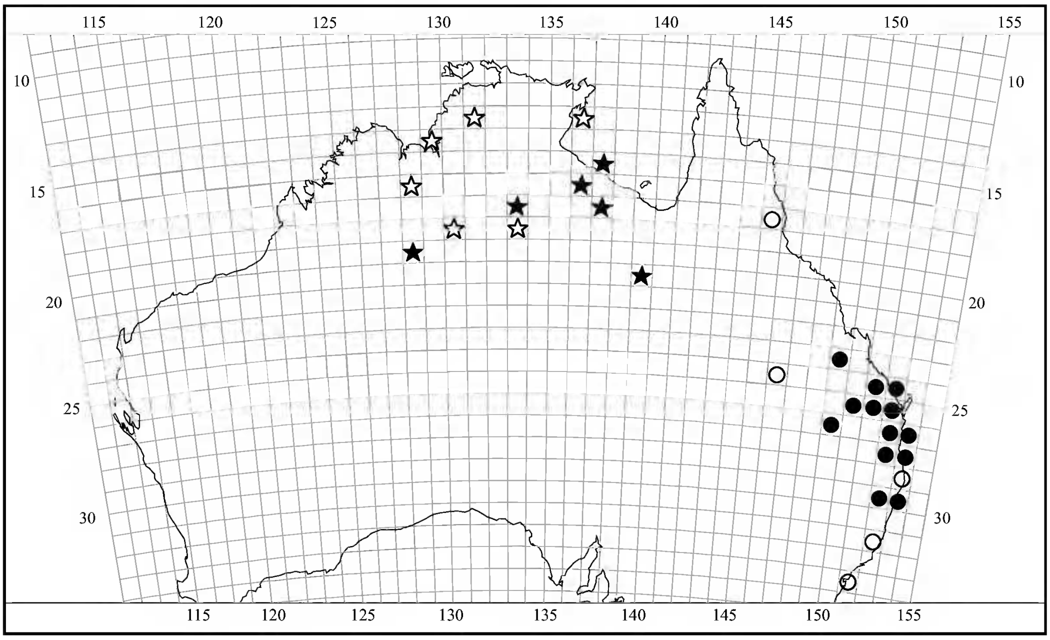
Map 5. Distribution of ● *Stylidium semipartitum*, ★*S.delicatum*.



Map 6. Distribution of ● *Stylidium multiscapum*, ★*S.mucronatum*, and ▲ *S.velleioides* (○△pre-1960).



Map 7. Distribution of ★*Stylidium rubriscapum*, ▲*S.paniculatum* and ● *S.ornatum* (○ pre-1960).



Map 8. Distribution of ● *Stylidium debile*, and ★*S.floribundum* (○☆pre-1960).